101

Syllabus

TECHNOLOGY FOR HIGHER EDUCATION

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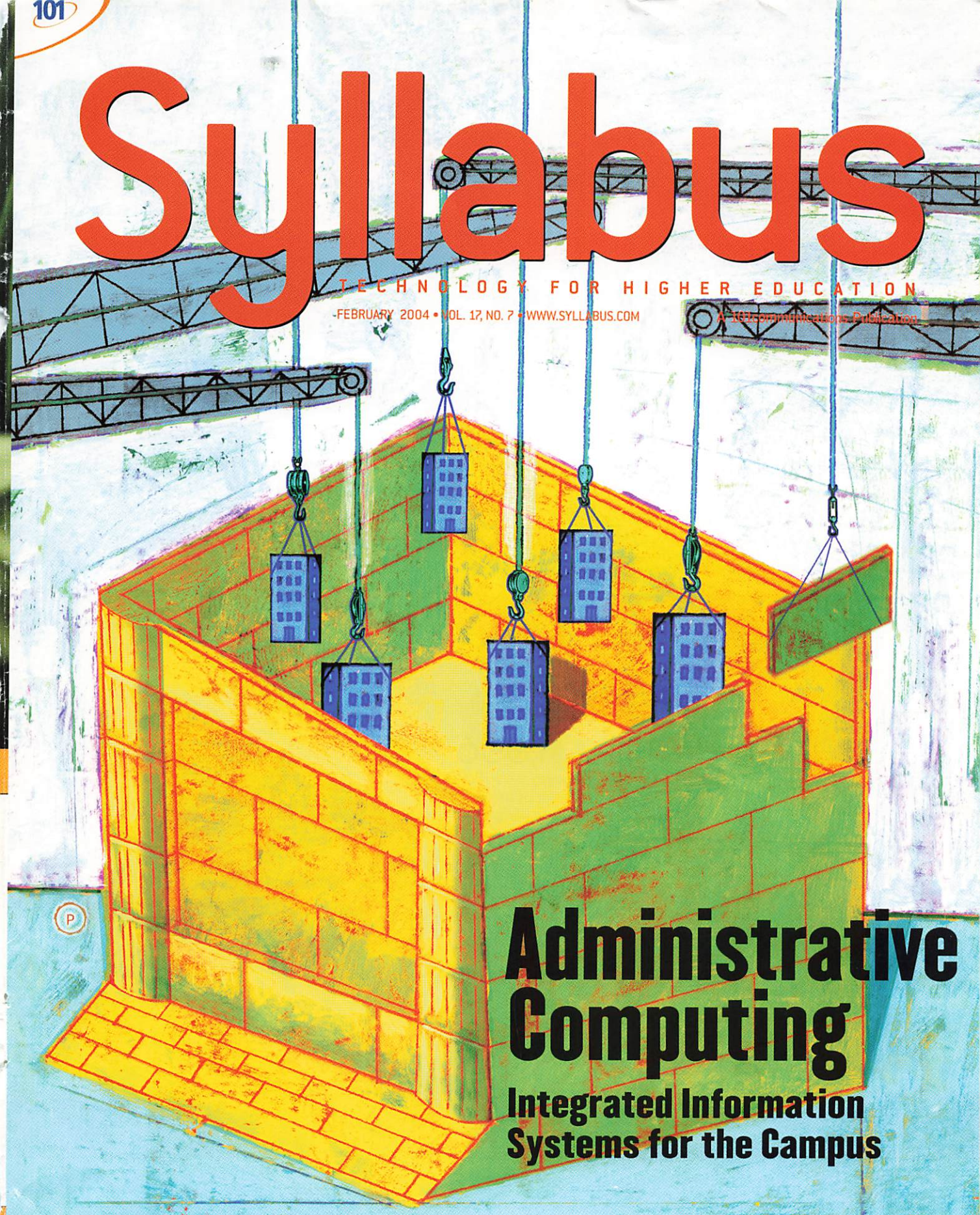
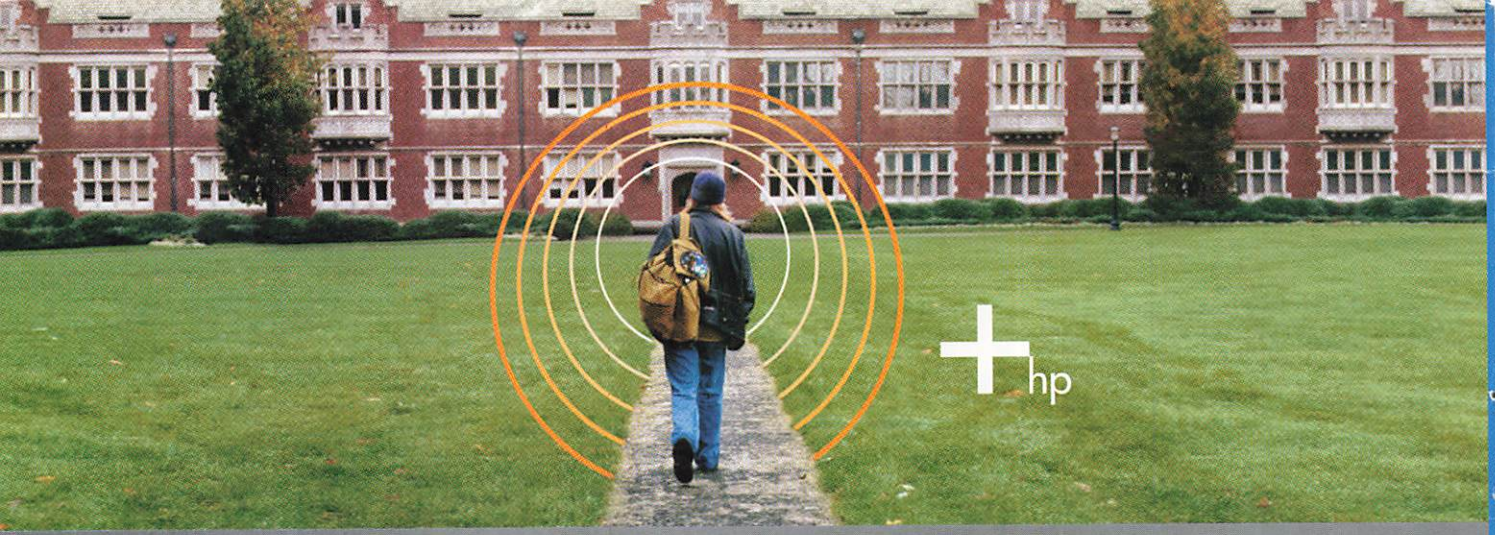


Administrative Computing

Integrated Information Systems for the Campus

INSTITUTIONAL PORTALS • ERP SYSTEMS IMPLEMENTATION • WEB SERVICES



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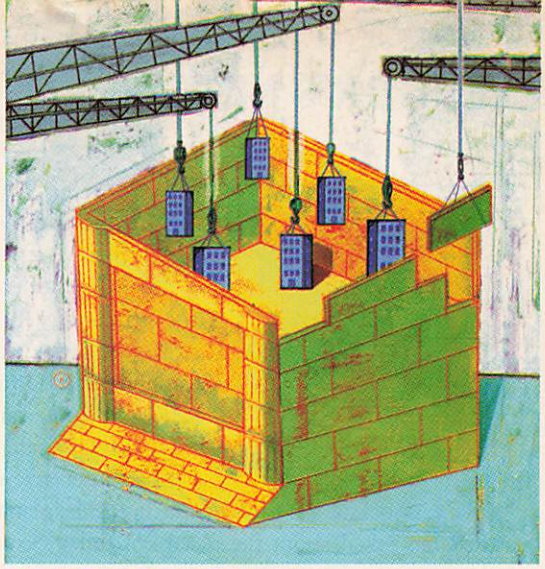

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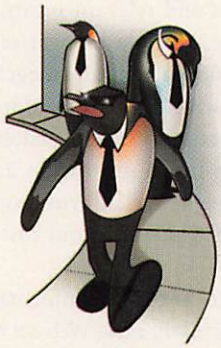

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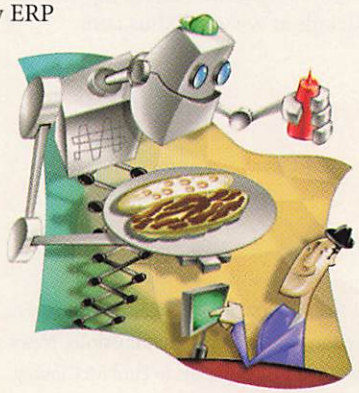

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EDITOR'S NOTE

Mary Grush, Editor

Administrative systems now are very different than they were ten, or even five years ago. Technology-savvy students, faculty, and staff are expecting 24/7, Internet-connected access to personalized information and a range of interrelated services that often combine academic and administrative functions. In this issue, we explore integrated information systems on campus and the key technologies that support them.

In an interview with John Camp, Wayne State University's Associate VP for Computing & Information Technology and CIO (page 10), *Syllabus* asked about the nature of today's complex enterprise information systems. Integration is key to planning and maintaining these mission-critical systems. At Wayne State, acquiring integrated software suites from vendors—rather than building or customizing best-of-breed components—is a strategy that serves both affordable system implementation and manageable long-term maintenance. Such systems also address scalability, "...up to a university with fifty thousand students, or down to a college with many fewer," explains Camp.

Portals allow institutions to offer an array of services and relevant information to their constituents. In "Portal Integration and a Scalable, Flexible Enterprise System" (page 20), Bruce Taggart examines the enormous potential for portals integrated with scalable administrative systems. Portals are still evolving, with the need to address issues like open standards for data and messaging, and integrating back-end databases and auxiliary systems. But portal technology has gained a lot of ground in academia. "Twenty years ago, it was not possible to share and exchange information among the primary administrative departments," writes Taggart, pointing out just how far we've come.

Web services technologies are becoming important to integrated information and business services on campus. Though they are not particularly new, Web services may be coming of age in higher education computing environments. While most users are not aware of the application of Web services technologies in the enterprise information systems they use every day, the benefits to the campus are significant. Our feature article, "Presenting the X Campus" (page 26), provides a glimpse into the world of Web services.

And finally, we take a look at the reigning enterprise technology. "ERP: The Once and Future King of Campus Computing" (page 29) offers insights from campus technology leaders and a sampling of the latest trends in ERP system implementation.

Save the dates for Syllabus2004—July 18–22! Our annual summer conference will be held in downtown San Francisco, with one day of programming across the bay on the UC-Berkeley campus. Watch for conference program details at www.syllabus.com.

Enjoy this issue of *Syllabus*!

Mary Grush

Letters to the editor should be addressed to the editor and sent to 101 First Street, #605, Los Altos, CA 94022, or via electronic mail (mgrush@syllabus.com). We reserve the right to edit all submissions. **News and product information** will be considered for publication. Please send all materials to Paul McCloskey. If you are interested in writing for *Syllabus*, please send a brief description of your article idea along with writing samples to the editor at the above address.

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> **10:45 pm.** To provide more answers to more technology questions, CDW•G account manager Nora Weeks engages in her own form of homework.

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Phillip D. Long

TRENDS

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Windows for Heterogeneous Environments

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- 6.4GB hard drive
- 64MB RAM (upgradeable to a max of 256MB)
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- 56-Kbs modem
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- Windows 95
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- Integrated Sound Blaster with a pair of speakers
- 48x DVD-CDRW Combo Drive
- Windows XP Pro

We have broken away from the tyranny of the mainframe. Ever since the image of liberation offered by the video announcing the Macintosh, a homage to Orwell's 1984, we have endowed the user with evermore powerful, personal computers. Occasionally a special tool emerges, like the Palm Pilot, which provides personal information management services (PIM). Of course the handheld PIM is being pushed to do more—becoming an MP3 player, a camera, a phone, etc. But the exception proves the rule.

With independence has come a fair share of problems. We're finding PC prices dropping only slightly while capacity, capability, and complexity increases exponentially. This shortens the lifespan of PCs. Most of us are replacing desktop systems every three to four years. Recall that in 1999 Intel introduced the 500Mhz Pentium III processor, NVIDIA released the first graphical processing unit (GPU), and the IEEE published the 802.11b wireless protocol. If you're not replacing your 1999 workhorse PC (see sidebar), your students and faculty are not being served.

Yet you're still reeling with the cost of support. The complexity of today's computer classrooms and labs is driving up the costs of integration testing, configuration, and installation. Is there no end to this?

If you prize flexibility then there is no alternative but to provide the environment that is able to support it. It's costly, but you can run the software you want, configured how you want it. However, if you can find significant areas where standardization is a positive attribute, then deployment of "thin client" computers may work for you.

What's a Thin Client?

A thin-client computer is stripped down to the basics. It has a network card, processor, video card, and some local memory. The processing is done on the server. Thin clients are built with small, single-chip designs that reduce power consumption, maximize Internet compatibility, and present a simplified, controlled environment for more tractable software integration.

On a thin client all applications actually run on a shared server or group of servers, and are not executed by the client desktop. The client is responsible for managing the screen, keyboard, and mouse information, passed to it by the server, nothing else. Instead, the application server must have software installed on it to manage multiple application sessions corresponding to the sessions users are running.

Centralized applications and processing

Dumb Terminals	Windows Server or Citrix MetaFrame	Networked Computer	PC
Connected to a mainframe (or in today's terminology a central server)	Connected to a server	Networked to a server	Usually networked to a server
Programs originate & execute on the server	Programs originate & execute on server; graphics execute on desktop	Programs originate on server & execute on desktop or server	Programs usually originate & execute on desktop, but can originate or execute on server

Based on http://www.vecmar.com/thin_client/thin-client-definitions.htm

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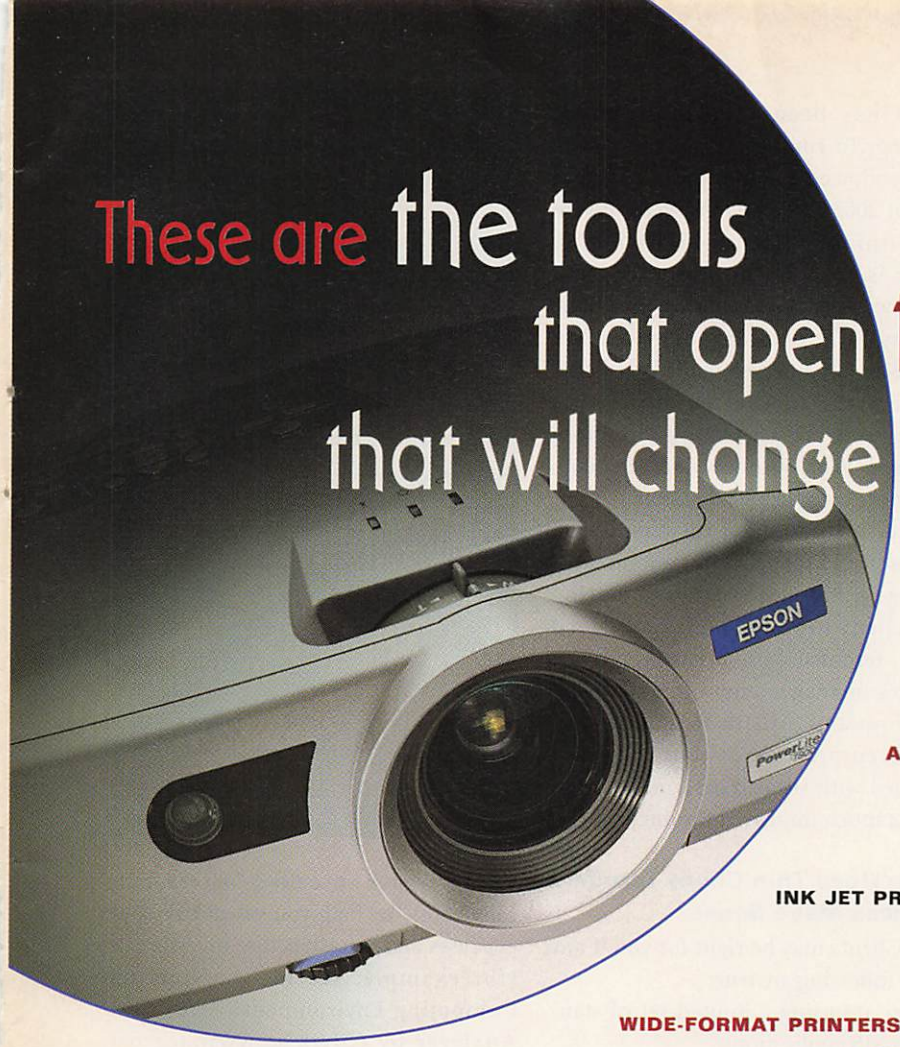

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dramatically reduces the need for hands-on maintenance. Upgrades and profiles are done on the server and automatically deployed to every location with a client connection not by transferring the new upgrades down each client, but enabling all the clients to leverage the server's upgrade and profiles. The need to touch the installed base of machines is radically reduced. Of course, there are application deployment tools that push out software from applications servers to connected PCs. But the simplicity of the thin client approach makes it unnecessary to push out applications.

Remote Desktops vs. Remote Applications

Running Windows on the server simplifies things considerably. But you still have a choice to make. Are you going to run a full Windows desktop or do you want to run just the applications that matter to you and nothing more? A thin client running a virtual desktop is both the simplest but also least flexible environment. Running applications from a client extends your options since the client can itself be something other than a PC. Why would you do that? One way to break the tyranny of three-year equipment renewal cycles is to extend them. But older PCs don't run today's applications. Then again, an older PC acting as a client isn't running the application, so it lives to work for another day.

Shades of the Mainframe

If this looks familiar, it is. The mainframe has been reborn in server clothing. To run this kind of environment you need the Microsoft Windows 2000 or 2003 application server software at a minimum. Microsoft Windows Server is the foundation for all these Windows thin client options. The limitations of Terminal Services on Windows 2000 Server made it suitable for only the smaller environments where users are accessing full remote desktops. With Windows Server 2003, it's a more complicated decision.

After having taken the first steps, Microsoft did very little for a long time, leaving creative third parties to develop thin client functionality. In stepped Citrix, Tarantella, and others to provide services, management, and scalability. The boys and girls in Redmond may have been preoccupied but they have returned with studied determination to build a much improved product.

When Does Thin Client Terminal Services Make Sense?

Thin Clients may be right for you if any of the following are true:

- you are using a limited set of standard MS applications;
- you are not currently running an enterprise-wide managed Windows environment;
- your enterprise is very distributed, with many WAN links;
- your network needs upgrading;
- you have a significant number of client devices nearing replacement.

Figuring out the cost effectiveness of a thin client is no small task. Various vendors have so-called "assessment calculators" to help you categorize your expenses and infrastructure investments (for example, see the Application Computing Environment (ACE) Cost Analyzer by Citrix at www.acecostanalyzer.com/).

While the above conditions may tilt the calculation toward the thin client direction, probably the two most important factors that make thin clients or terminal application environments attractive are: (1) having a significant number of PCs used to run a restricted set of applications, such as MS Office and a few standard Windows programs; (2) having a mixture of clients who need to run critical Windows applications. Either of these two settings may lead you towards at least a small Windows Terminal Services implementation. After that, the ability to be sure a program will run on a variety of client machines after being set up once starts to make you wonder where else it might fit into your enterprise infrastructure.

A Sampling of Application Server Environments

- Terminal Services for Microsoft Windows Server 2003
  www.microsoft.com/windowsserver2003/technologies/terminalservices/default.mspx
- Citrix MetaFrame XP Presentation Server 1.0 w/ Feature Release 3
  www.citrix.com/
- Jetro CockpIT 3.0 / BoostIT 3.0
  www.getech.co.uk/products/jetro/cockpit.htm
- Tarantella New Moon Canaveral iQ 2.0
  www.newmoon.com/
- DAT Panther Server 2002
  www.pantherpowered.com/
- Neoware
  www.neoware.com/products/

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Thin Clients Fat Savings
Rishi Seth, November 25, 2003
www.zdnetindia.com/news/features/stories/820,93653.html

Thin Client Tablets
www.networkcomputing.com/1309/1309sp5.html
www.ncd.com/products/hardware/ts_voyager/

Server-Based Computing Software Roundup
Brian Madden and Gabe Knuth, October 2003
www.brianmadden.com/reviews/SBC_Software_Roundup.htm

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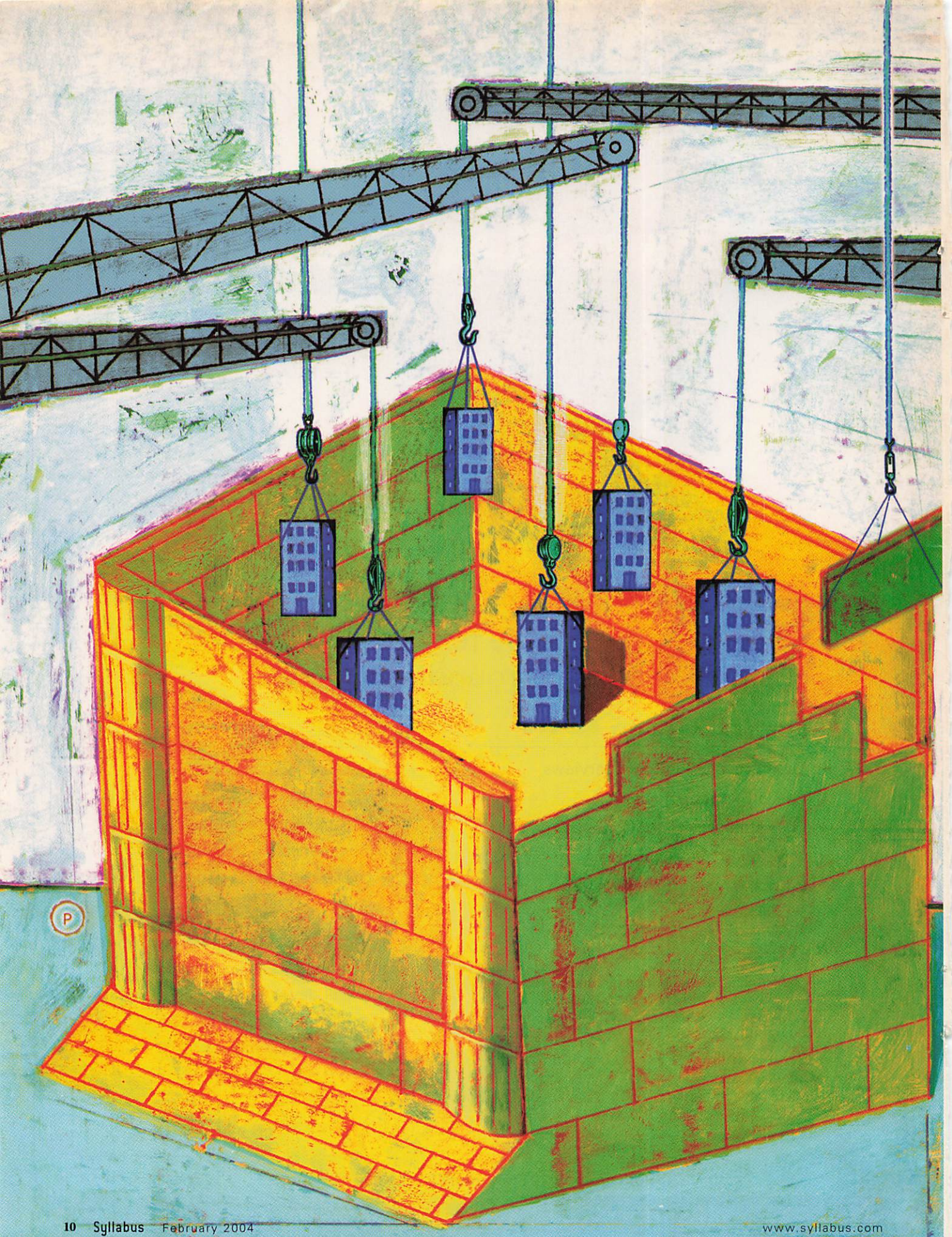


Administrative Computing:

Integrated Information Systems for the Campus

A Conversation with John Camp

Today's administrative systems are powerful, Internet-connected, and merging with academic systems. In a conversation with John Camp, Wayne State University's Associate VP for Computing and Information Technology and CIO, ***Syllabus*** *learns about the issues and opportunities associated with integrated information systems on campus.*

Syllabus: How have administrative systems changed in the past five or ten years?

John Camp: In general, evolution has led to bigger, better, more complex systems—certainly very much more complex than the legacy systems from a decade ago. And almost everything has to work together today; there's clearly a merging of administrative and academic systems. Integrating them can be difficult and challenging, but very few stand alone any more.

S: What do these systems help you accomplish?

JC: When I think about information systems in higher education, I don't think initially about the systems *per se*; rather I consider strategic goals and one of those is to make it easy for people to do business with us. This is coming a little later to higher education than to corporate America, where making it easy for people to do business with you is absolutely vital. People walk away from a company today if it's difficult to do business with. And the same thing is happening in higher education, especially with the growth of broadband connections that enable access very conveniently from home to services and education from universities anywhere. If we're

Illustrated by Peter Bennett

not easy to do business with, people will look elsewhere.

Prior to Internet-based services, at my university and many others, if a student wanted to register for classes, she had to find an advisor in one location, register at another, and then pay fees elsewhere. It was pretty difficult to do business with higher education. The Internet has changed all that.

S: So is Internet access causing a lot of change in administrative systems? Are these systems very different when you factor in Internet access?

JC: In higher education, the Internet is a huge change agent. And it does enable potential students or current students to get to information, services, and education electronically at their convenience. There's still going to be a huge place for face-to-face instruction. However, there are educational experiences that can be meaningful and effective, done conveniently online. Every college or university that's going to survive in the future will have to provide a variety of ways to educate students. One way will be electronic.

For example, students at Wayne State can get to a schedule of classes online, register for those classes, and then pay their fees online. Minutes later they're all set to access course materials in advance of the start of the classes. So Internet-based, self-service is here to stay, and in most cases, it must be continuously available. That's radically different than a decade ago.

S: Are there opportunities for your institution to consider globalization?

JC: Lots of opportunities. Wayne State University ranks about seventeenth in the nation in the number of international students served. That means, by the way, when international students want to contact Wayne State to inquire about programs or to apply, or if they're home and they want to register for classes for the next semester, they have to do it in their time zone, not ours. That means WSU's information systems have to be highly or continuously available.

In the old days of administrative information systems in higher education, legacy systems ran from 8:00 a.m. to 7:00 p.m. and then you shut them down so you could do backup and maintenance. That's all changed with the Internet. We have to be almost always available. And that places a huge burden on the infrastructure you implement to run these systems well.

S: How would you characterize the merging of administrative and academic systems?

JC: The walls are already coming down. I recall debates in the past about the pros and cons of consolidated versus separate administrative and academic computing divisions. I think separate and independent divisions are dinosaurs. With the growth of portals and the potential to unify access to any and all systems, there is very little way to tell whether a system or function is administrative or academic.

S: Do you have an example?

JC: Consider the tight integration required between course management systems, like Blackboard, and the core information systems that you run. We happen to run SCT's Banner suite at Wayne State. If students want to get to Blackboard for online education, they sign on to our unifying portal—we're using the Pipeline/Luminis product. Once they get into that portal, they might want to first check their e-mail. They could even register for classes or check their grades, or do a whole host of other things, and then go seamlessly into Blackboard where they complete or submit course requirements and participate in interactive discussions that professors have established on topics of interest. All this—general productivity work like checking e-mail, administrative tasks such as registering for classes, and academic activities like participating in an online teaching/learning experiences—is done in a seamless way, through the unifying portal. Certainly academic and administrative systems are merging. They have to, because they're related and must be integrated.

S: How critical are today's enterprise systems to supporting the institutional mission?

John S. Camp, Ph.D.

John Camp is the Associate Vice President for Computing & Information Technology (C&IT) and CIO at Wayne State University in Detroit, Michigan. He is responsible for enterprise-wide strategic and tactical planning activities, implementing those plans, and coordinating information technology activities at Wayne State.

A notable initiative under Dr. Camp's leadership is the Sun Center of Excellence for Administrative Systems at Wayne State, one of a small number of centers of excellence worldwide. Sun and WSU are designing an integrated solution for optimizing SCT's Banner suite of administrative applications. The center also sponsors research and development projects that benefit other colleges and universities using SCT's suite. Among them are knowledge modules for SCT applications, and Banner forms on Solaris.

Camp served as chairperson of the EDUCAUSE Network Awards Committee and is on the board of directors of Merit Network Inc. He is currently a Member-at-Large on the SCT Banner Advisory Board and is Wayne State's representative on the SCT Pillar Institutions Group.

JC: Well I happen to think they're absolutely critical and strategic. They bring the teaching, learning, and research elements together. For example, one of the non-SCT modules in our information systems environment is research management. Most of the federal agencies today require that you interact with them electronically. They don't want to deal with paper. And so, universities like Wayne State have to figure out how to manage the research process electronically—submitting proposals, establishing accounts for awards, managing accounts, and submitting final reports. Research management is an important, strategic component of WSU's underlying information systems environment. A first-rate information systems environment in higher education is absolutely essential. It supports teaching, learning, and research as well as the general business of the university.

S: What are the main issues in planning and implementing large administrative systems?

JC: There are several that I consider vitally important. One is selecting the right partners. When we were doing this in the late '90s, we looked at all of the major software and hardware companies, and we also had to make project decisions. We selected SCT software and Sun hardware and middleware, along with a commitment to strict adherence to project management principles and practice.

We considered and then rejected a strategy that might be called 'best of breed,' building an information systems environment using components from various software and hardware companies: the best housing component form this company, and the best human resource module from that company. And the best human resource module from that company. You'll cobble them all together.

Not too long ago I had lunch with a CIO from one of the big three automotive companies. I asked him about his strategy for building information systems to support the worldwide global needs of that giant company. He told me that the company used to purchase best-of-breed products, but couldn't afford that approach anymore because it's too difficult to integrate products from many different companies and ensure that they work well together. The first step in planning and implementing large information systems is to select the *right* partners for implementing a truly integrated solution.

Buying an integrated suite gives you more assurance that when new versions or releases come out, the components within the suite are tested and certified to work together. Integration, for me, is key. Best of breed has appeal, but you have to have very deep pockets to do that. Some universities can. But most universities and colleges cannot.

S: What are some of the other issues you wanted to mention, concerning planning and implementation?

JC: I think it's vitally important to do good, consistent project management. In general, IT projects have historically tended to take too long and go over budget. There's a lot of research to suggest this, and much of the reason for it has to do with ineffective project management. So at Wayne State we took about a year to prepare staff, both from IT and from the business units, to use and understand project management principles, methods, and tools. When we replaced every one of our legacy systems, brought up a portal and a course management system, and integrated e-mail and other systems, we were within budget and almost right on schedule. Good project management was key in all of that.

We wanted personnel to understand in advance that they would participate in weekly or bi-weekly status report meetings. These are not working meetings, they are status meetings focused on major tasks to determine if they are on schedule or if there are problems. If a major task is on schedule and has no problems, we move on to the next task leader. The whole purpose of a status report meeting is to identify problems sooner rather than later. You have to teach this to people who manage projects as well as to those who work on projects so they understand both the theory and the methodology. And good project managers are not a dime a dozen. We've had, here at Wayne, some project managers who are worth their weight in gold because they really know the art and science of managing projects.

Another related issue is developing

"Certainly academic and administrative systems are merging. They have to, because they're related and must be integrated."

A SAMPLING OF PRODUCTS INTEGRATED INTO WSU'S INFORMATION ENVIRONMENT

- **SCT Banner and Pipleline/Luminis:** Information suite and access to all e-services
- **Blackboard:** Course management system
- **OneCard:** eCard for bookstore, libraries, parking
- **Oracle:** Databases
- **Mirapoint:** Enterprise messaging
- **Sun Microsystem's Java Enterprise Suite:** OS/clustering, enterprise directory

realistic project and annual budgets. We try to present both one-time and annual budgets simultaneously. Initially, I may not know all of the costs on the annual side, but I want university executives and others to understand the categories of annual costs. On an annual basis, you have to implement new releases. You have to replace hardware periodically. You've got lots of licenses to pay for.

Everyone should understand that when the project is done, annual activities and associated costs continue. Once that's understood, we can proceed to work together to document, discuss, and determine what those activities and costs should be.

And finally it is important to be sure, that people involved in these projects are engaged, and are encouraged to hang tough and hang together when problems occur—and they will. This is, you know, the art of getting people to work well together. But I think it's also an issue about how you develop that top-down and bottom-up buy in. In effect, these are not IT projects; they are university projects.

S: Are there any differences in technology implementation strategies between very large institutions and mid-sized or smaller institutions?

JC: In general, I would say no. There aren't many differences in the strategies for large and small implementations. I'd still focus on project management, on budgets, and on selling why we're doing this within the university. I think the strategies aren't different. It's just a matter of scale.

S: How do you make these systems scalable?

JC: Much of that is just architectural. For example, we've implemented clusters of Sun servers at Wayne State, with automated fail-over. If there is ever a problem on any one of these servers, we automatically fail over to another so the service is not disrupted. And this model of clustering and fail-over is scalable. I can cluster small servers or large servers depending on the size of the institution. On the software side, the scalability issue comes back to the vendor. In most cases, software vendors like SCT are architecting their information systems in a way that they can scale up to a university with fifty thousand students, or down to a college with many fewer.

S: And how do you design flexibility in the systems, to allow for necessary modifications as your institution's strategic goals change?

JC: First of all, we take, and I take, a perspective that we cannot afford to build our own information systems. Years ago, many universities did just that. At Wayne State, we built, acquired, and customized systems to reflect the Wayne State way of doing business. And we learned a hard lesson—the systems became extremely difficult to change as our institution was changing.

Today at Wayne State, to maximize flexibility we resist customizing the SCT Banner system to reflect Wayne State's way of doing business. We recognize that there are some voids. So, we build a limited number of surround systems, which augment, rather than customize, our core Banner systems. And then we work assertively with SCT to encourage them to build these surround systems into their base product. The flexibility you asked about comes, I think, from not customizing core systems, building surround systems when needed, and then working with your vendor to modify its systems to your requirements.

S: Do you have an example of one of the surround systems you built?

"When we replaced every one of our legacy systems, brought up a portal and a course management system, and integrated e-mail and other systems, we were within budget and almost right on schedule. Good project management was key in all of that."

JC: Yes. We needed a space management system that provided us with good information about space utilization at Wayne State University, for a number of reasons, including federal reporting requirements. The SCT core system didn't have an adequate space management facility, so we built one and integrated it with Banner rather than customizing Banner itself.

S: Could you describe criteria for selecting vendors?

JC: I'm looking for a vendor that shares our vision about higher education and how information systems can help to achieve that vision. In addition, I look for a vendor with a track record for executing on its vision—vision is important but without the ability to execute, you don't get very far. I look at financial stability, and then, of course, I look at functionality.

S: What role do vendors play in designing an implementation strategy? How do they affect the way you approach this?

IT STEERING, ADVISORY, AND OVERSIGHT AT WAYNE STATE

Information Technology Steering Committee (Enterprise policies, priorities, and funding)

External/Internal IT Advisory Boards (Strategies and plans for the intelligent use of IT)

Project Oversight and Management Teams (Oversight and management of approved, major projects)

JC: The vendor partners are critical resources. Their consultants have experience implementing their solutions elsewhere, so you want to capitalize on that. And certainly when new versions or new releases come in, vendor consultants have firsthand experience with the changes. We tap their expertise to bring our staff up to speed quickly.

At Wayne State we used consultants from SCT and Sun throughout our implementation project, and now periodically when major changes occur in their product lines. We bring on-site experts to campus to work with staff to understand the changes in the system and to mentor them so that the changes move forward smoothly.

S: Should planning for administrative systems include various constituent groups on campus? What are the practical limitations?

JC: You can't engage everyone so you need a process that includes key stakeholders. At Wayne, we are implementing four types of boards and committees—advisory, steering, oversight, and management. The university's advisory boards provide advice about the intelligent use of information technology to enhance teaching, learning, research, and services. The Information Technology Steering Committee deals with funding, policies, and priorities, while the project oversight and management committees support and guide the implementation of major IT projects for specific applications of IT. These boards and committees have specific roles so that the university's IT strategies are sound and plans to achieve them are completed successfully.

For example, our Information Systems Oversight Team is a group of senior executives who have a vested interest in the quality of the information systems at the university. The Provost, senior executive for academic affairs, the Vice President for Finance and Facilities, the Chief of Staff and Executive Vice President, who also deals with advancement and human resources, our Vice President for Research, WSU's director of University Budget, and the CIO serve on this committee. This is a hugely important group to convene—it really 'owns' the university's information systems environment and has a vested interest in its quality.

In addition, for each major project we convene a Project Management Team with a sponsor from that area—it could be an alumni advancement project or a project in human resources, for example. The team includes the project sponsor, manager, and key individuals who are able to allocate resources within the areas served by the project.

S: Are administrative systems going to keep up with user needs and expectations?

JC: I've been in this business long enough to know that if you simply go to any college or university campus and ask how well the information systems satisfy needs, you're going to get complaints as well as positives. I don't expect that we'll ever get to the state where our information systems satisfy all of our needs. Higher education changes and hence needs and expectations change. The important role of IT is to help colleges and universities achieve their strategic visions by enhancing teaching, learning, research, and service. Not always easy, but certainly rewarding.

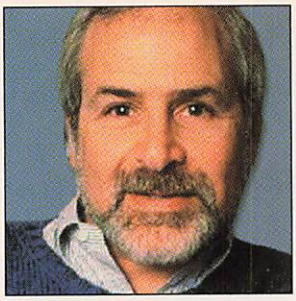
S: What do you see as the next challenges or potential opportunities for administrative systems in the next five or ten years?

JC: It's necessary to help the university community understand that we're in a new era of information systems. They have to be always available, Internet-based and functionally rich, and they're going to change. We're in a period of constant change. That's a lot different than in our legacy era during which many universities built or mass customized like we did, and the information systems really didn't change very frequently.

There will always be opportunities that we will want to pursue. One of the newer things we're doing at Wayne State is building a very robust grid computing environment for research. If at all possible, we want to integrate our grid into the university's network, security, identity, and information systems.

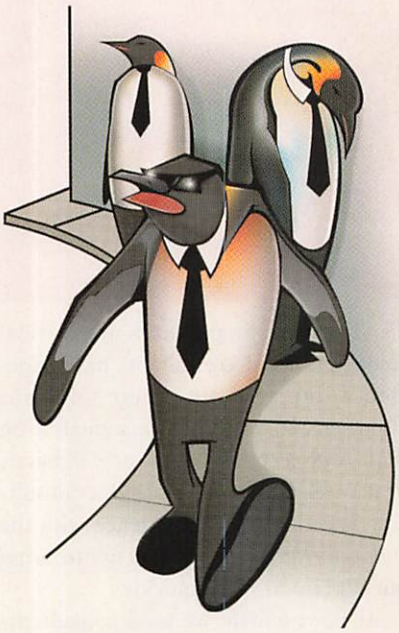
One of the important challenges is ensuring that over time you can maintain, sustain, and enhance the systems you've created. That really goes back to annual budgeting and getting the key people together to think not just about the project at hand, but about the future.

> "The vendor partners are critical resources. Their consultants have experience implementing their solutions elsewhere, so you want to capitalize on that."



Kenneth C. Green

DIGITAL TWEED



The Penguins Are Coming

We begin today's quiz with a ten point question: What do Mohammad Ali, "A Beautiful Mind" author Sylvia Nasar, Harvard professor Henry Louis Gates, Jr., actress/director Penny Marshall, and legendary UCLA basketball coach John Wooden have in common?

They all make prominent (if brief) appearances in a recent IBM television ad promoting Linux. Interestingly, the ad is titled "Prodigy."

[This ad and others in the series is available on the Web: http://www3.ibm.com/e-business/doc/content/ondemand/prodigy_transcript.html.]

These five celebrities, plus actors and actresses hired to portray an anthropologist, an astronomer, a corporate executive, a poet, a soccer player, a pilot, and a plumber, all speak to a young child, each offering a small bit of wisdom. The visuals close as the female voice asks if the child has a name and male voice answers, "his name is Linux." At the end, as the screen goes white (not dark!), the text flashes: LINUX–The Future is Open–IBM.

Something is happening here. Yes, IBM supports Linux, as do Dell and HP. The big firms have bought in big, reflecting best guesses (and some very big investments) that there is more than one window into the continually evolving world of information technology.

But think it through: Linux is for techies, right? It has never been promoted as either "user friendly" (the marketing message for MS-DOS when the IBM PC was launched more than twenty years ago) or "insanely great" (Steve Jobs' catch phrase for the Macintosh).

And on the chance that you might occasionally think about Linux, what comes to mind? Open Source? Content? Free stuff? Shared software? Alternative to Windows? Community? Clearly Linux and Open Source are many things to many people.

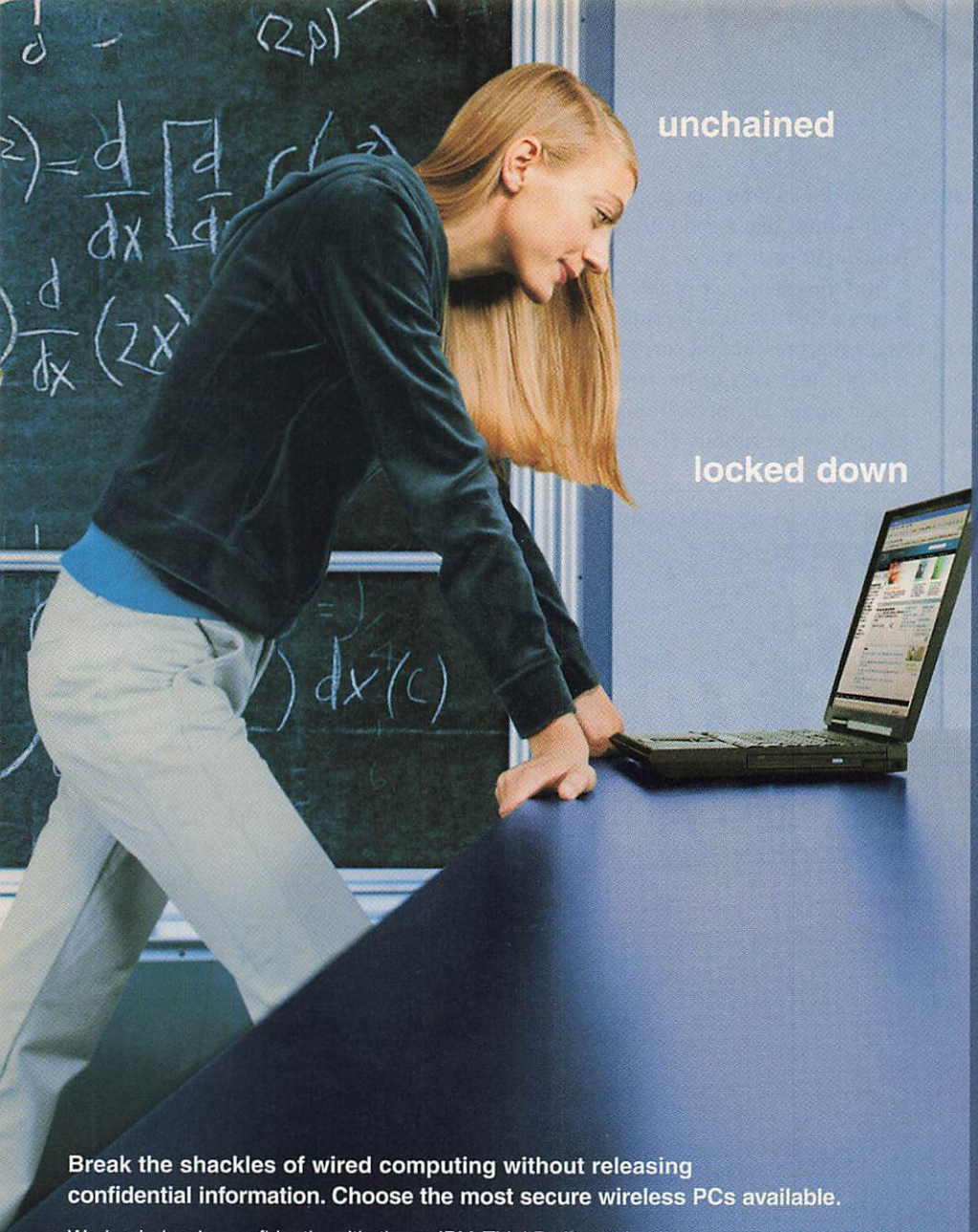
What groups are the intended audience for this long (90 second) TV spot? Perhaps the primarily target is corporate CIOs and others in the IT community. IBM's support for Linux represents the ultimate affirmation of the emerging trend. Also, knowing that IBM now aggressively sells and supports Linux probably provides some comfort for other, non-IT, mid-level and senior corporate execs who are struggling to map the changing landscape of back office technologies as well as emerging corporate and desktop applications.

But what about the rest of us non-techies who are neither Linux/Open Source advocates nor antagonists, but rather somewhat confused agnostics? How do we know if the terrain is really shifting? How should we measure the size and impact of the shift? How soon, if ever, does our watching from the distance begin to get up close and very personal if/when Linux becomes the window into data and applications on our individual computers?

It's a fair guess that Mohammad Ali, Professor Gates, Ms. Marshall, Ms. Nasar, and Coach Wooden probably do not spend much time writing Linux code or even using Linux applications. But their appearance in an IBM commercial about Linux sends a very significant message: look around, take notice, as Linux is beginning to emerge from the back rooms.

I'm one of the agnostics: I know something—Linux—is happening. But I also don't know how to assess just what is happening and what it means for me, if not now (in 2004) then maybe in 2005 or 2006. So as I watch, I'm also wondering how soon and how fast. And I'm wondering what, if anything, do I do and if or when should I do it?

Does anyone have a reliable road map or a timetable for us civilians? What about a filter to help us distill the facts from rhetoric that we hear from both advocates and antagonists?



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(not shown)

Distinctive IBM Innovations:

- Embedded Security Subsystem 2.0 – strongest security as a standard feature
- Access Connections – easiest wired and wireless connectivity

System Features:

- Intel Centrino mobile technology
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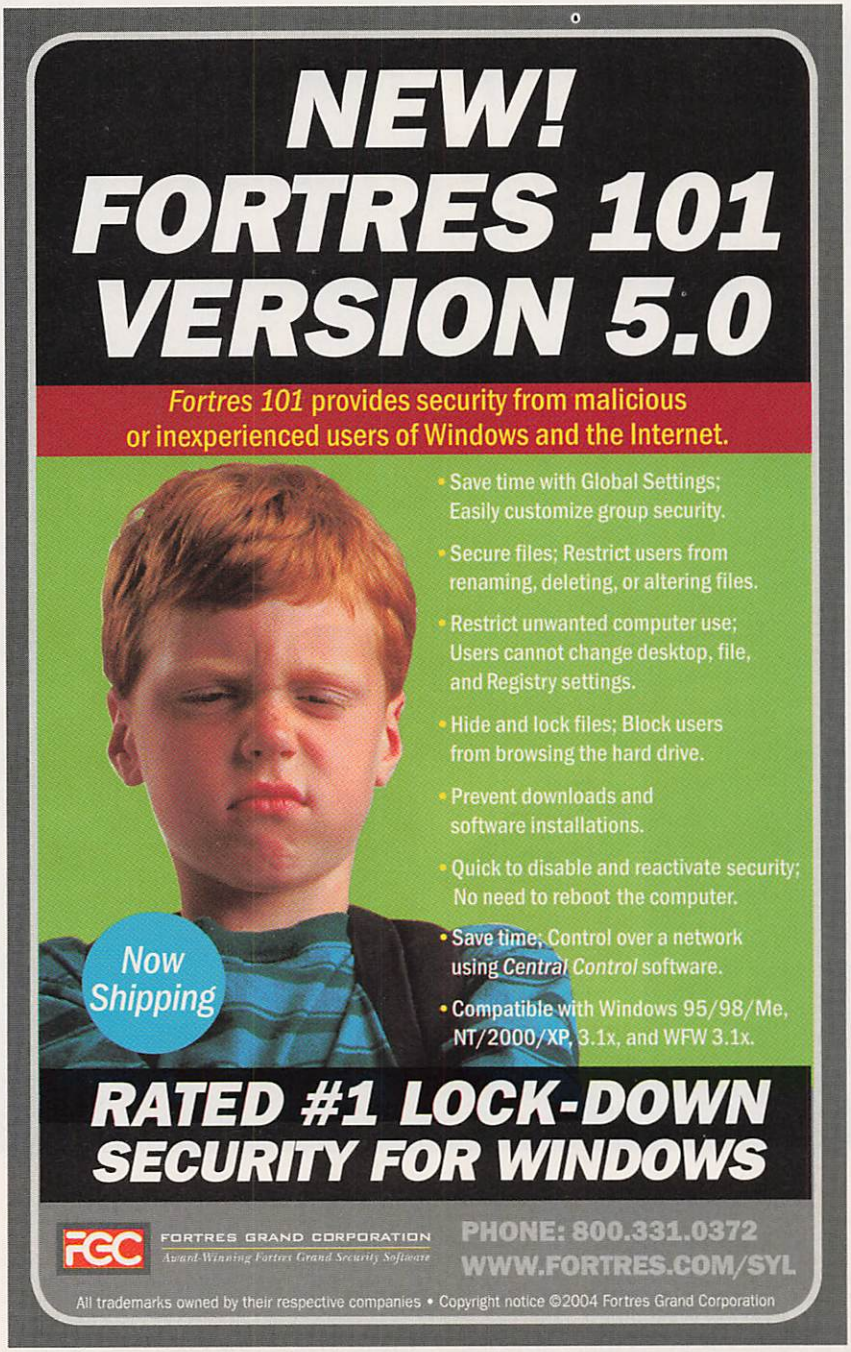
And the penguins? Probably a small stroke of marketing genius that these lovable (non-threatening and decidedly *cool*) creatures have become a corporate logo and IT community icon for Linux.

The World Book Encyclopedia that my wife and I bought for our children some (pre-Internet) eons ago describes the penguin as an "unusual bird [that] walks with an amusing, clumsy waddle." That sounds like a good description for Linux in its early years.

But the experience of the past decade suggests that Linux is loosing its waddle as it gains presence on corporate servers and becomes part of the larger conversation about IT applications—in both campus and corporate IT environments and also on user desktops. An early example of desktop deployment is in Brazil, where the Ministry of Education has selected Linux as the operating system for millions of new computers that will go into Brazilian schools over the next few years. So the penguins are coming. And perhaps, coming soon to a desktop near you, will be "Open Source for the rest of us."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*Casey Green (**cgreen@campuscomputing.net**) is founding director of The Campus Computing Project (www.campuscomputing.net), a visiting scholar at The Claremont Graduate University and a visiting professor at Case Western Reserve University.*

Editor's note: Readers may be interested in viewing "An Open Conversation About Open Source," a Webcast moderated by Casey Green. The Webcast was recorded at Syllabus fall2003 in Cambridge, Mass. and archived online, with MIT sponsorship. It is intended for faculty, administrators, and staff who do not write code or have advanced degrees in engineering, but still want to understand the issues that drive the Open Source movement in higher education.

The Webcast features two separate discussions of Open Source in higher education:

Part I. What is Open Source?

—Is it code? Is it content? Is it shared applications?

Panelists: MS Vijay Kumar, Ed Walker, and Phillip D. Long

Part II. The OpenCourseWare Initiative at MIT

—Open Source in curriculum and community

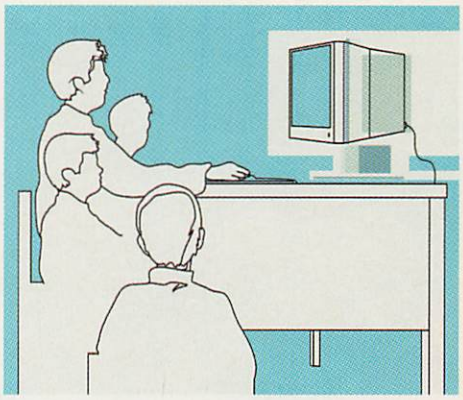
Panelists: Ann Margulies and Steve Lehrman

To view the Webcast, visit: **www.syllabus.com/opensource**

David G. Brown

FACULTY PRACTICE

Demonstrating Good Teaching



Often candidates for tenure and promotion, as well as course designers, complain that too little credit is given for their use of technology in teaching. Usually, they're wrong. Most disciplines at most colleges seek out and honor the capacity to use technology in teaching and research. The problem is not undervaluing the use of technology or not undervaluing the importance of good teaching. The problem is *measuring* effective teaching.

Scholarly research seems to be more valued only because it's more easily measured: by grants received, refereed articles published, citations to one's writing by respected authors, and the critical reading of scholarly writing by tenure and promotion committees.

The irony is that departmental colleagues, deans, trustees, legislators, and students want to reward effective teaching at least as much as quality research. The challenge is differentiating exceptional from ordinary teaching, separating good teaching from the mediocre.

Evaluators need help. Professors being evaluated can help themselves as well as the evaluators by taking advantage of available technology to measure and make visible good teaching? Here are 10 ideas that can help:

1. Encourage departmental colleagues to view and analyze the activity on your course Web site.

2. Require students to complete some final exam sessions questions by constructing a Web page or a PowerPoint presentation.

3. Cite numbers demonstrating collaboration (e.g. entries in a chat room discussion), Peer-to-Peer and Peer-to-Professor e-mails.

4. List the ways, both face-to-face and electronically, in which students interact with each other and with the professor.

5. Name the individuals (and their positions) with whom students interact (for example, practitioners in the field).

6. Ask students, about every three weeks, to e-mail you comments about how the course is going, its strengths and weaknesses, and how it can be improved.

7. Invite colleagues to visit your class.

8. Seek and archive student comments on the effectiveness of the course for a particular session.

9. Seek and archive comments from practitioners and professorial colleagues who collaborate with you for a particular course.

10. Maintain an electronic "teaching portfolio" for the purpose of self-evaluation and for sharing with P&T committees as well as prospective employers.

Please share your ways of making effective teaching more visible so they can be added to this list!

The primary value of using technology in teaching is increased communication—communication of course content, communication for the sake of improving the course, and communication for demonstrating its effectiveness. We are already rich in data to demonstrate effective teaching. By using it we can implement our desire to reward good teaching.

Generating and using such data brings one more immense benefit. By studying the data ourselves, we can learn what's working and not working. This feedback can be used to improve our course and teaching effectiveness. Using technology in the evaluation and marketing of good teaching makes good sense. As the measurement of teaching improves, we can expect that both the quality of teaching and the rewards for teaching will increase.

David Brown (brown@wfu.edu) *is vice president and dean of the International Center for Computer Enhanced Learning at Wake Forest University.*

Portal Integration and a Scalable, Flexible Enterprise System

By Bruce M. Taggart,
Lehigh University

Integrating the institutional portal with better, personalized services is a goal that can be accomplished with scalable administrative systems.

Advancements in technology and the adoption of standards are steadily moving higher education toward the attainment of a single, integrated enterprise system. This achievement will enable institutions to maximize their knowledge base, ensure the integrity of their data, gain new efficiencies, and provide even better services to their constituents. However, in order to realize this vision, progress must be made in two areas: increased personalization of services and resources within the portal to the enterprise system, and the integration of underlying auxiliary applications.

The introduction of the portal to higher education has truly elevated and unified the accessibility of an institution's services and resources, presenting users with what appears to be a single enterprise system. Using a single sign-on, learners, faculty, and others can register for courses, submit assignments, attend study groups, purchase tickets to athletic events, check the weather forecast, send and retrieve e-mail, and execute numerous other activities in support of their academic and personal goals.

More than an Interface

The mere expansion of resources and services available through an institution's portal is not sufficient. These services and resources must also be personalized and relevant to each

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Dates & Locations	TDWI Event	Featured Topics & Programs
February 15–20, Las Vegas, NV	World Conference–Winter	Comprehensive course schedule featuring TDWI's *Business Intelligence Strategies*
March 8–11, New York, NY	Seminar Series	BI Fundamentals, Data Modeling, DW Architectures, Data Acquisition, Advanced Data Modeling, and Data Cleansing
March 29–April 1, St. Louis, MO	Seminar Series	BI Fundamentals, Data Modeling, DW Architectures, DW Step by Step, and Advanced Data Modeling
April 19–22, Vancouver, BC	Seminar Series	BI Fundamentals, DW Lifecycle, DW Architectures, Data Modeling Fundamentals, and BI Roadmap
May 9–14, Boston, MA	World Conference–Spring	Comprehensive course schedule featuring TDWI's *Business Intelligence Strategies*
June 7–10, Chicago, IL	Seminar Series	BI Fundamentals, Corporate Information Factory, DW Architectures, Data Modeling, and DW Lifecycle & Dimensional Modeling
June 28–July 1, Anaheim, CA	Seminar Series	BI Fundamentals, Data Modeling, DW Architectures, Data Acquisition, Advanced Data Modeling, and Data Cleansing
July 12–15, Toronto, ON	Seminar Series	BI Fundamentals, BI Roadmap, DW Architectures, Data Modeling, and DW Lifecycle & Dimensional Modeling
August 8–13, San Diego, CA	World Conference–Summer	Comprehensive course schedule featuring TDWI's *Business Intelligence Strategies*
September 13–16, Minneapolis, MN	Seminar Series	BI Fundamentals, DW Lifecycle, DW Architectures, Data Modeling, and Corporate Information Factory
October 4–7, Washington, D.C.	Seminar Series	BI Fundamentals, Data Modeling, DW Architectures, DW Step by Step, and Advanced Data Modeling
October 31–November 5, Orlando, FL	World Conference–Fall	Comprehensive course schedule featuring TDWI's *Business Intelligence Strategies*

Important Web Addresses for 2004

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user. A student may—or may not—find the information he or she is seeking. For example, students might never find their way to student groups that have the potential to enrich their campus experience. In order to be truly effective, the views and information presented must be personalized to each user. At Lehigh University, our goal is to increasingly personalize our portal to the needs of each individual user and to make it their primary institution resource.

The mere expansion of resources and services available through an institution's portal is not sufficient.

For example, in 2003 we conducted our summer freshmen orientation completely online through our portal. All the resources that freshmen needed, from "meeting" with counselors and library services, to gathering information on residence halls and food services, were available online. The students even took their calculus readiness exams online. The information presented to each student was personalized based on his or her role that we identified from the data in our SCT Banner Student system. The first year arts and sciences majors were presented with all the arts and sciences resources that they needed, in addition to general information about the university. Likewise, engineering majors saw course information related to their area of study.

By eliminating our summer on-campus orientation, we saved the university considerable expense and also prospective students the time and cost of traveling to Lehigh. The response from students, deans, and others was overwhelmingly positive. Over 90 percent of the students found the portal information useful or very useful. Equally important, this initial and extensive interaction with our portal indoctrinated the freshmen to view the portal as their initial and primary source for campus information and resources. The virtual orientation was complemented by our standard three-day orientation held the weekend before school began.

Lehigh will soon be live with a MyLibrary portal, which is an open source initiative, started by Eric Lease Morgan from University of Notre Dame. Lehigh is partnering with Notre Dame to implement this within the SCT Luminis portal. Currently, some of our faculty view our portal as simply a place to check that latest sale bulletin board, to read the *New York Times* headlines, or to view the weather forecast. This library application will pull them into the portal and help them understand its potential as a powerful, personalized resource. The application will integrate and personalize various library resources through the portal.

For example, a physics instructor will be presented with all the electronic journals, databases, and library contacts pertinent to his or her field of study. A math instructor will be presented totally different, tailored resources. This is accomplished through integration at the presentation level and through the portal integration.

Beneath the tapestry of the portal lie disconnected auxiliary databases...

Students will also be presented with this resource. A music major, for example, will see library catalogs and holdings that relate specifically to music. A very powerful aspect of MyLibrary is that new content will be dynamically offered to faculty or students based on their discipline. In addition, users can customize their page to limit the displayed resources to those they are personally interested in. By placing MyLibrary in the portal, we are offering instant possibilities for personalization and customization of library resources.

Creating Better Services

These are just a few examples of how Lehigh is personalizing our portal applications to meet the individual needs of our users. Our goal is to meet 90 percent of the users' needs so that they do not have to seek out the information elsewhere or recreate their views on the portal. In addition, we continually expand our portal capabilities to include extended and unique applications. By doing so, we are able to provide high-quality, personalized information and services, and extend the value of our existing investments.

When learners enter an institution's portal, they are greeted with what appears to be a seamless fabric of integrated and accessible services and resources. Beneath the tapestry of the portal lie disconnected auxilary databases and applications. This is the layer where the next evolution of integration must occur in order for institutions to achieve a true single enterprise system where data and messages are exchanged in real time.

Indeed, the evolution of the portal is creating the need and the issues surrounding integration of systems "behind the scenes." From within our portal, faculty have an option of entering grades in either SCT Banner, our administrative system, or in Blackboard, our course management system.

This creates a need for real-time data exchange between Blackboard and SCT Banner Student. Otherwise, the data would be out of synch; or possibly it would require data re-entry, which is inefficient and prone to errors. There are numerous other examples where we need automatic population of data to corresponding systems.

Examples include posting library fines to the finance system, and inte-

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grating health services, university student smart cards, parking, performing arts, and other auxiliary applications and services to the institution's core administrative system. Vendors have achieved integration among their core modules, like human resources, finance, financial aid, alumni development, and student, but more progress is required to integrate auxiliary applications from other vendors or those developed by an institution into the core administrative system.

Implementing the integration technologies requires overhead and time...

Vendors have been working to address this challenge and are currently delivering integration technologies for third-party applications. But integration is, by nature, very complicated and dynamic. Implementing the integration technologies requires overhead and time on the part of the university's technical staff.

Data Standards and a Modular Approach

An important development in easing the integration hurdle is the acceptance and adherence by vendors to open standards for data passing and message passing. Already we have made inroads that we weren't even discussing two years ago, like the real-time exchange of data between our SCT Banner Student system and our course management system, Blackboard. Lehigh also utilizes Touchnet, a payment gateway application that allows prospective students the ability to pay their application fees online using a credit card. Alumni and other constituents can also utilize this application to make gifts to Lehigh online using their credit cards. A degree audit and reporting system (DARS) is another third-party application that is integrated with SCT Banner. This application provides students with the functionality to ascertain their academic standing related to the courses needed for graduation.

By taking a modular approach, we can integrate these third-party applications, and others—like dining services or health services—of our choice rather than being forced to purchase and license a broad package of applications that we do not want or need. Likewise, this approach allows institutions to select a variety of third-party applications that meet the needs of individual service groups, like parking.

While vendors continue to evolve the technology, institutions need to tackle an internal cultural issue if they want to achieve an integrated enterprise system. That is, sacrificing some functionality within the administrative system for the sake of integration. For example, a vendor's administrative system might have a weak grant application. Some institutions might opt to purchase that application from a different vendor. It is possible to repeat this scenario over and over, from department to department. Also, some institutions might feel that their legacy systems as a whole, or a particular in-house application, have functions that they cannot sacrifice.

Over time, these institutions are faced with maintaining and integrating multiple vendor or in-house systems, just in support of their basic administrative functions of finance, HR, financial aid, and alumni development. These simply cannot be maintained effectively and efficiently. More importantly, it creates a significant and added barrier to eventually integrating the auxiliary applications in order to achieve an enterprise-wide integrated system. In addition, these multiple shadow systems degrade the integrity of an institution's data.

For example, if the alumni department has a separate external system where they are updating alumni addresses, there is no reliable, real-time method for that data to be updated in the institution's master student system.

Scalability of a Single Enterprise System

Integration within the core administrative system is available "off the shelf" from vendors, and institutions should take advantage of the benefits enabled by this integration. Existing systems can scale and evolve as needed with the integration of third party systems. But institutions also need to overcome the mindset that their needs and processes are so unique that they need to build, connect, and modify these core administrative systems. Even if an institution has a large and skilled IT staff, it needs to consider whether developing new custom applications is the best use of their time in support of an institution's mission.

Twenty years ago, it was not possible to share and exchange information among the primary administrative departments. Individual departments maintained their own discrete data systems, often with conflicting data. Information can be shared seamlessly between financial aid, finance, the student, human resources, and alumni departments. And the portal is providing constituents with a user-friendly, 24-hour access to these databases and other university resources and services.

The next frontier is the integration of additional auxiliary systems. The creation of this single enterprise system will require time, effort, and expense on both the part of institutions and vendors. However, it is achievable. As a result, institutions will be able to make even greater strides in maximizing the knowledge base of the institution, ensuring the integrity of their data, gaining new efficiencies, and providing even better services to our constituents.

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Puzzled by CMS?

CMS Review Syllabus

Wednesday, October 15, 2003

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Viewpoint

A Challenge for Any CMS

By Frank Tansey

The installation and maintenance of a course management system is a challenge in most situations. Campus and organizations installing a CMS must add to their existing infrastructure and then address the issues of obtaining and maintaining content, as well as addressing support and technical services.

As difficult as it might be to install and maintain a campus-based CMS, imagine the issues that must be addressed to create a technical infrastructure in areas where none now exists. Then add a critical need to introduce online learning concepts to a population with limited access to personal computers. Finally, and perhaps most important, provide content to address critical societal needs.

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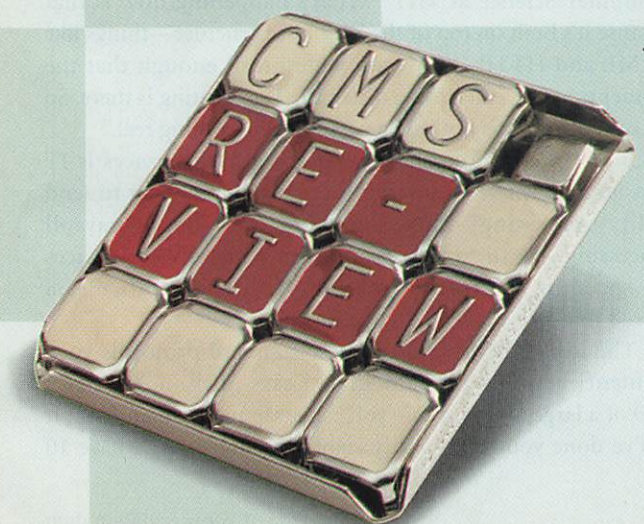

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TECHNOLOGY FOR HIGHER EDUCATION

Presenting the X Campus

By Paul McCloskey

Web services represent the Internet mapped onto real, dynamic business processes. They are the Internet come of age.

If you draw a blank when presented with the term, "Web Services," you are probably not a technology bellwether on campus. On the other hand, if you think Web services are old hat, your office is likely to be pretty high up in the ivory tower—or maybe just over in electrical engineering.

What's going on here? What are Web services? And how can a technology be considered cutting-edge and "nothing new," at the same time?

Web services are objects, data, or applications that can be connected, integrated, or re-used regardless of where or how they are used on the Web. They can be dropped into a host application or platform without extensive coding or programming. A simple example might be a Boulder, Colo., real estate company having a mortgage calculator on their Web page that is hosted by a New York bank. Or something as complex as providing customer access to a corporate ERP.

Web services represent the Internet mapped onto real, dynamic business processes. They are the Internet come of age.

A professor wishing to aggregate data from colleagues at three different universities most likely would have to initiate an e-mail campaign to acquire the data and then reformat it so it could be studied by all three. In the world of Web services, each professor would publish his data as a Web service— to be "consumed" and read by each colleague.

What's old hat is Web services have been around since the first standards for interoperability were written. These standards—HTTP for transport; XML for syntax; WSDL, the Web Service Description Language, for services interfaces; and Simple Object Access Protocol (SOAP) for reusable objects—are now coalescing in ways that support real business integration across desktops, campuses, or governments.

"Basically Web services is distributed computing; it's the same vision people have had since 1980," says Hal Abelson, a professor in the Department of Electrical Engineering and Computer Science at MIT. "What's happening now is that because it's built on top of the Web infrastructure—things like HTML and HTTP—those are widespread enough that the momentum for really doing distributed computing is there. So the overall vision is nothing new; it's just becoming real."

One of the obvious business uses for Web services is IT outsourcing, where Web services are making it easier to send utility processing—data crunching, back-up, or payroll processing—to third-party service providers. Web services are speeding the transformation of the back office as a shared resource.

"The idea is that by using these standard protocols your [content] becomes more modular," says Abelson, "and as a CIO of a large organization, you can swap pieces in and out. If you've done your modularity right, you don't say, 'I have 10

servers located here and there and I'm going to use three of them for back-up.' Instead, you think, 'I have a backup service,' And in the long run if you plan your infrastructure that way, it gives you increased flexibility to evolve."

Web Services on Campus

While Web services are in their infancy at most universities, some important progress is now being made. The iCampus program, for example, is a joint venture between MIT and Microsoft to use Web services in several pilot projects to provide academic and administrative services to a big group of campus users. The projects incorporate Microsoft's .NET technology as a Web services framework.

In one of the projects, iLab, MIT is using .NET Web services to create a Web-based microelectronics lab—an actual lab, not a simulation. Abelson is quick to point out—that students are using to do their required lab work in an engineering course remotely.

The application is a transistor characterization experiment during which students execute voltaic signal transmissions from their dorm rooms to transistors in the lab and observe the results. The students control all the inputs from the server. The project has proven hugely productive, requiring only five minutes of actual experiment time versus the hour it takes when a walk back and forth from the lab is added; a much higher rate of actual equipment usage has also been noted.

MIT is now readying about six or seven additional remote labs using the .NET Web services framework to enable experiments using accelerometers, strain gauges, heat exchange, and polymer crystallization.

MIT is looking closely at the potential economic savings from resource sharing enabled by Web services. While at a cost of $50,000, it could not afford to maintain the transistor measurement equipment even for a large undergraduate course. The school sees the experiment as a model for how multiple universities, or a consortium, might host lab servers for common core science courses and spread the expense.

Ultimately, MIT envisions setting up centralized management and control services to provide the authorization, resource allocation, and event notification services necessary to launch online laboratories in a way that could be scaled across multiple universities.

"Basically Web services is distributed computing; it's the same vision people have had since 1980."

"If I have a transistor characterization experiment, I'm not going to scale that inside the university," says Abelson. "You scale that with individual courses that are happening all over the world using the same experiment."

Administrative Web Services

Another MIT Web services project involves the same principle—re-using a common application across a multi-user base—but this time involves an administrative application. Each year, MIT, like most schools, administers a writing test to its incoming freshmen.

Several years ago, the school made the exam available to students via the Internet. The test involves notifying students by e-mail during the summer that an essay question based on assigned readings will be sent to students on a certain date. Students have a set amount of time to do the readings, write the essay, and return it to the university.

Although administering the test is fairly simple, it requires some management infrastructure to do authentication and notification. While MIT and Microsoft initiated the system, it is now operated by a consortium of six universities. The organization, which is now trying to sustain itself as a non-profit, has been approached by additional universities to administer other test and common administrative services.

Web services has also had a role to play in MIT's Open Courseware Initiative to make course content available for free over the Internet. Today, the system is run on a Web services platform that ties Linux servers together with Microsoft's Content Management Systems.

When MIT decided it was going to make its course content available over the Web for free, Microsoft took note, understanding the project might also be a candidate for Web services. Ultimately, Microsoft Content Management Server was tied into the courseware delivery system, the final result including both Linux and Microsoft servers operating jointly on a Web services platform.

"These actually became diamonds in the rough," said Randy Hinrich, group manager for research at Microsoft. "We started them early, in an experimentation phase. Now they have matured to become our premier solutions at MIT, and all of them wrapped around this concept of Web services for learning."

Setting Up Web Services

If you are not a member of the engineering or computer science faculty, but want to tap into the Web services, how can you set up your Web site to consume or publish Web services? Corel is one company now marketing Smart Graphics Studio, a tool a tool for setting up Web services.

"Web services represents a point in the evolution of the Web where what was promised in the dot com era can finally start to happen."

"Higher education is a very challenging IT environment because you have a wide group of faculty and staff with a lot of data, and Web sites here and there," says Ian LeGrow, vice president of Corel Smart Graphics. "Tying it together is a huge challenge. By using

Web services there is potentially a backbone to standardize that."

Corel's Smart Graphics Studio enables Web developer to create Web services applications from a graphical environment. Web developers can mark information as dynamic, identify data flow processes, and choose how to represent data. "Basically, we do for dynamic interactive applications what Dreamweaver and FrontPage did for HTML, says Rob Williamson, product manager for Smart Graphics Studio. "You don't' have to write all that code to make it work; you just drag and drop." (See sidebar: WYSIWYG for Web Services.)

Looking Ahead

Web services represents a point in the evolution of the Web where what was promised in the dot com era can finally start to happen. Indeed, while dot coms more or less got the vision right (i.e., everything moves to the Web) they did not have an underlying service-based architecture in place to make the ideas actually happen.

"Web services did not take off like it might have had the economy not gone through this slump," said Abelson. "Everyone expected that industry would be making the investments and switching over to Web services architectures about two years ago. And that's still only just starting. You need a couple of years of that, and more examples like remote laboratories and essay and writing administrations. Those will come."

With the advent of Web service technologies, open, dynamic business processes—transactional processing driven by end-users—now can start to happen. Right now, the focus is on integrating data and simple applications on demand. What now seems like the demonstration phase of Web services will move into the background, and an environment that is inherently collaborative and integrative will emerge.

"On one hand you want to be able to create a set of standards that deliver content," says Hinrich. "On the other hand you want to start developing collaboration, communication, and interaction—things like shared annotations and shared workspaces."

"This is just the beginning of what will become the next wave of Internet technologies that allow people to interact with the world around them."

"Ten years from now your personal communicator will include broadband capability and a rich color display, and you'll expect to be able to interact directly with your data," says Corel's Ian LeGrow. "This is just the beginning of what will become the next wave of Internet technologies that allow people to interact with the world around them."

Ultimately, Web services will enable what might be called the X Campus, a place where users can collaborate interoperable systems and data. A step closer to a vision as old as the Web itself.

WYSIWYG for Web Services

Corel's Smart Graphics Studio is a tool designed to make building Web services interfaces a simple proposition for the Web developer.

"The tool codifies this process behind a WYSIWYG-type interface so that someone can very easily connect to a Web service, get the data they want, and then make a meaningful interface for the consumer," says Ian LeGrow, vice president for Corel Smart Graphics.

The consumer of course has no idea what a Web service is—they just want the data. "We've simplified that process so you don't have to have a Ph.D. in computer science in order to use Web services, which was the problem before," says LeGrow. "What was missing was a tool to simplify the consumption of Web services, aggregation of them; and then the display of Web services to end-users."

With out a way to do this, even simple collaborating can now be difficult on the Web. "Today, it's difficult to make a simple pie chart from disparate sources of data, says LeGrow. "If you're using Excel and all the data is on your desktop, Excel makes it easy," he says. "But let's say you want to aggregate data from three different locations. It's no longer so easy—you are sending spreadsheets around. Whereas by simply publishing your data as a Web service and putting a common front end on it, you can consume that data and interact with it easily."

One of the enabling standards that will help drive adoption of Web services is Scalable Vector Graphics (SVG), an open standard for describing XML-based vector graphics that is integrated into Smart Graphics Studio. Using SVG it's possible to associate various data with a graphical object. Then it becomes possible to "data-drive" the objects using Web services, so they can graphically represent changes occurring in data over time.

Researchers, for example, might create a pictorial representation of a turbine they were monitoring from a distance by putting Web services interfaces on the machinery. Or, a Web services temperature gauge might dynamically report the temperature via a thermometer graphic

"We make it easy to reuse pieces," says Rob Williamson, product manager for Smart Graphics Studio. "From a development point of view we can design a workload so that instead of being an over-the-fence process where the designer says, 'I want it to look like this,' and then throws it over the fence to the developer, it's easy enough that often the designer can handle the basics of building the application themselves."

ERP: The Once and Future King of Campus Computing

In higher education, ERPs are no longer optional. But many approaches exist to fit the individual campus.

By Catherine Murphy

ERP, or enterprise resource planning systems, are in place at many colleges and universities, and many more are considering going with ERP in the future. The promise of ERP is that it will integrate disconnected business operations such as student administration, human resources, and financial systems that have been previously handled by disparate legacy systems, while satisfying the need for real-time, on-demand information.

Using the Web, new ERP platforms can not only help streamline university business processes for school administrators, but also for students, faculty, and alumni. Using their own PCs, these constituents can access their own data, look up their own grades, register for classes, and apply for financial aid through the ERP system. Staff can apply for new positions and access their employee records without having to visit human resources.

Connecting the ERP system to a portal pushes the data and applications even closer to the user, eliminating many interim steps, shifting some of the work burden from the provider to the end user.

So far, ERP sounds like a great idea. Yet, converting to an ERP system is a bit like building a new house to replace an old bungalow. You know you need it, and you can imagine how much more functionality the new house will have, but the old house is paid for and hard to give up. Plus there's bound to be disruption during the building process and of course some surprises along the way.

So the first principle of ERP is: expect the unexpected. According to William Shepard, director of applications integration and development for Cleveland State University, what people expect from an ERP implementation does not always

The promise of ERP is that it will integrate disconnected business operations such as student administration, human resources, and financial systems...

match reality. "When you think of expectations and reality, remember these two words: reduction and increase," says Shepard. "Everyone thinks they'll save something–people, costs. The reality is that you usually don't."

Many schools don't anticipate the costs they'll incur in training and hiring staff. The transition to a new software platform may be a difficult adjustment for some employees. According to Dave Wasik, director, enterprise applications services for the University of Akron, "Unless you spend extra money on staffing, you won't be able to take advantage of what ERP can do. Training is expensive, but it's more expensive not to train."

Ultimately, ERP changes the university's entire approach to both handling information and serving users. "ERP forces you to change your fundamental approach to problem solving," says Shepard. He also recommends providing support during the transition. "You have to transform your staff," he says. "It may be helpful to provide some remedial training for them, so that they're trained for the systems and software they're going to have to handle."

Keep in mind, also, the cost of outside consultants or partners. While these can be expensive, they can also be invaluable, says Dave Swartz, CIO for George Washington University. Swartz recommends spending the money to get the expertise you need. "Recognize that they [the vendors] are your partners. You have to choose a partner that will step up and knock out any problems that come up."

Still, it's the CIO or system manager who has to decide what roles to give to in-house staff and what to hire out. Project management is critical to successful implementation. Some institutions may feel more confident hiring an outside consultant with previous experience in implementing ERP systems. Other institutions may want to lead the project from within.

And don't forget about the costs of hardware. The initial costs can be staggering, especially if new client hardware is involved. It's helpful to plan this upfront with a strategy for adding and upgrading units as needed. Says Shepard, "You need to keep the PCs relatively current and maintain them, and that takes money and staff. We [at Cleveland State] implemented a PC buying plan and a four-year refresh program to replace the machines every four years."

Can an ERP installation be done affordably? Yes, depending on your definition of affordable. Says Swartz, "There is an ERP system for every type of institution. For instance, there are some vanilla systems out there that are quite economical."

Realistically, however, an investment in ERP is one of the most expensive IT investments a university can make. Overall costs in the tens of millions are typical. Wasik says, "The number of decisions are incredible. How much consulting do we need? How do we size processors correctly? These are all difficult decisions, but they have to be managed in order to manage costs."

Despite the costs involved, Shepard warns not to spend too much time watching the bottom line. "This is a big project," he says. "Don't try to be a hero, delivering something cheaper and faster. Go to the board and ask them for the time, money, and flexibility you think you will need. Don't expect to stay within a budget."

For Swartz, who has implemented a few of these systems, planning is critical, as is expecting the costs to continue over several years. "Expect the maintenance costs and upgrade costs to be high. They are very expensive and often underestimated."

Given that adopting ERP is such a daunting proposition, one might wonder if it's necessary. Wouldn't it be easier to simply avoid the whole thing? No way, says Swartz. "You have to do it to remain competitive. What's going to happen to institutions that don't move to ERP? They'll lose market share. Students will look at the school and ask why they're not offering what other schools have."

The consensus is that the benefits to the institution outweigh the costs. "Once you get the basic infrastructure in place, ERP makes adding on third-

continued on page 41

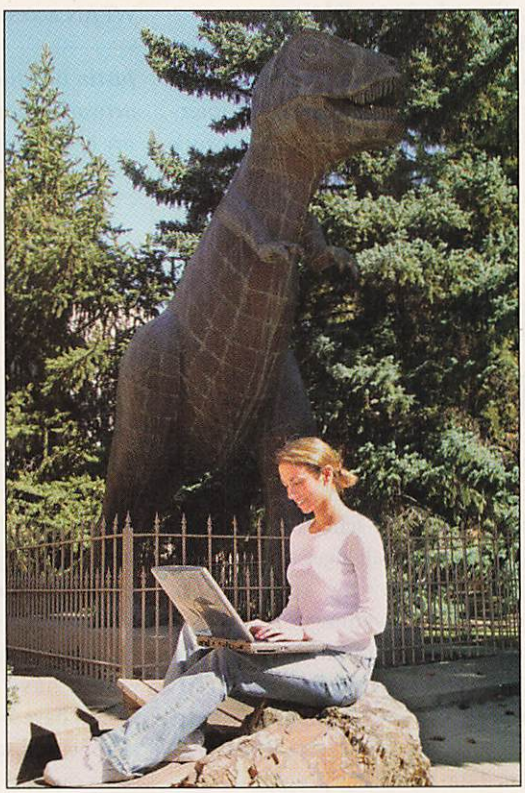
- **University of Wyoming** installs extensive WLAN management for stability and efficiency.
- **Central Michigan University** deploys more than 40 applications throughout the university.
- **Cedar Valley College** implements a video system into their distance learning program—providing a virtual experience for students around the world.
- Staff can now efficiently schedule and distribute software applications at **Virginia Commonwealth University.**
- **The New Media Consortium** conducts a real-time experiment in social computing to bring the community and practioners together.

University of Wyoming ▪ By Justin Borthwick

Overcoming Wireless LAN Management Challenges

In 1999, the University of Wyoming rolled out an 802.11-based wireless local area network (WLAN) and has a leading research university with more than 12,000 students and 10,000 faculty and staff. University of Wyoming planned to cover its entire 785-acre campus with a WLAN, requiring about 200 Cisco access points (APs). However, after installing 54 APs, expansion plans were temporarily put on hold. It had become evident that University of Wyoming required a greater degree of control, stability and efficiency in managing its WLAN before it could continue its large-scale deployment.

University of Wyoming needed a system to provide authentication, authorization, dynamic bandwidth management for users, applications to ensure optimal quality of service (QoS) at each access point, and out-of-the-box integration for a variety of AAA/directory systems, granular monitoring, and reporting of all WLAN activity. After conducting on-site evaluations of various systems in a lab environment, University of Wyoming implemented Central Site Director, a WLAN management, control, and integration platform from Roving Planet (www.rovingplanet.com).



Tracking WLAN Usage

Prior to implementing Central Site Director, University of Wyoming struggled with a lack of visibility and reporting. The university could tell whether an access point was up or down and what the aggregate throughput was but couldn't tell who the users were, how much bandwidth they were consuming, how long they were connected to a given AP, or what applications were being accessed. In addition, they could not track authentication failures, sense AP migration or tell which users were engaged in abusive usage, such as Peer-to-Peer file sharing. Finally, they lacked visibility into all of the AP configuration parameters.

University of Wyoming network administrators now utilize Central Site Director to easily track WLAN activity across its entire campus. Detailed, real-time reports communicate who is accessing the network, when, from where, and how long the applications were being used and the amount of bandwidth being consumed. In addition, University of Wyoming expects the dynamic policy management to become increasingly useful as wireless network utilization increases. For example, University of Wyoming can apply dynamic policy management to address requests from certain instructors to restrict Internet access or access to specific applications during their classes.

Implementing Secure Authentication

With its initial WLAN installation, University of Wyoming had relied on Mac filters for authentication and encouraged students to use

Cisco client cards because Cisco LEAP provides a secure authentication and encryption mechanism. However, this meant that students could lend their cards to other non-authorized users, and the Mac-based authentication left the wireless network vulnerable to Mac spoofing. In addition, until recently, any wireless user had been able get to every application available over the WLAN, which frustrated University of Wyoming's application administrators. They wanted to specify which servers, ports, and applications could be accessed depending upon the user.

Using their standard user IDs and passwords, students could authenticate into the wireless network—leveraging the existing system. They needed safeguards to protect applications, such as student information systems and lab applications.

Central Site Director provided an out-of-the box integration with University of Wyoming's Active Directory system, enabling University of Wyoming to authenticate users via user IDs and passwords rather than via Mac addresses. Network administrators can now monitor and protect applications, such as student information systems and lab applications, by specifying which servers, ports, and applications can be accessed depending on the user.

"Using their standard user IDs and passwords, students could authenticate into the wireless network—leverging the existing system."

Moreover, WLAN access for visitors and guests, which formerly required the manual entry of a Mac address for each guest user, has been vastly simplified via a default public user group. The University of Wyoming administrators can define this in terms of what applications and network resources will be available to such users.

Fast, Simple Installation

The Roving Planet system comprises an engine and agents, which are accessed and managed via a Web browser interface. The engine maintains all network information and policies, resides out of the data path, and communicates with the agents to deploy policies and manage wireless network activity. The agents are networked in the data path and function as an OSI Layer 2 bridge/pass-through to enforce access and bandwidth controls at each AP. XML gateways and the ongoing development of additional APIs facilitate simplified integration with existing systems and enterprise applications.

The Layer 2 architecture made Central Site Director extremely simple to implement and required very little configuration overhead. University of Wyoming was able to install Central Site Director, get it fully operational in about five hours and begin troubleshooting network issues via its real-time monitoring and reporting capabilities immediately.

The University of Wyoming is ready for the expected increase in wireless network traffic as broadband access becomes a common feature on many mobile computing devices and incoming freshmen come to expect WLAN access throughout the campus.

Justin Borthwick (jarik@uwyo.edu) is network systems manager at the University of Wyoming.

Central Michigan University ▪ By Shaun Holtgreive

Extensive Application Deployment with Minimal Resources

In the summer of 2003, Central Michigan University (CMU) deployed more than 40 applications throughout the university. Using the technology we had at our disposal, this would have taken at least six months. We didn't have nearly that much time.

Resource-Consuming Obstacles

We run most applications via Terminal Services and Citrix MetaFrame Presentation servers to enable more cost-effective, centralized management. However, to meet this back-to-school deadline we had to overcome challenges that, to date, had made deploying applications extremely time-consuming:

• *Inability to run multiple versions of the same applications on the same server:*

Seven of ourkey applications used various versions of Crystal Reports, a popular data-reporting program. Since different software versions cannot run on the same server simultaneously, we would have had to build and manage separate Terminal Services server groups, each running a different version of Crystal Reports. This would have required eight different servers. It also would have meant that each server would have been significantly underutilized, running at perhaps 30-40 percent of its capacity.

• *Applications that would not run more than one instance in Terminal Services:*

Several applications, including the conference scheduling software many of our staff rely on, could not run multiple instances in Terminal Services. Because they couldn't be deployed via our server-based system, IT had to manually install and support these programs on every user's desktop. This went counter to the very reason we were using Citrix server-based computing in the first place, since one of its greatest strengths is to centralize the administration of applications.

Application Virtualization

Our implementation vendor, RapidApp, told us we could totally eliminate these application conflict and multi-instance problems by using a new platform that virtualizes applications. The system, called Softricity SoftGrid (www.softricity.com), transforms Windows applications from products that must be installed and managed locally into virtual services you can deploy and manage centrally—even to remote laptops—without any recoding.

To eliminate application conflicts, SoftGrid avoids writing files directly to the registry and instead redirects them to its virtual "sandbox," a protective runtime environment that executes programs without altering the host computer.

Table 1 shows how the Windows application installs normally—permanently modifying the operating system's settings, including writing to the Registry, and installing specific versions of Dynamic Link Libraries (DLLs). Table 2 shows how a Windows application runs with SoftGrid—using a virtual copy of all its settings so they do not modify the operating system upon which the application is executing.

Accelerating Deployment, Simplifying Management

Using SoftGrid, we met our back-to-school deadline—and built a flexible software infrastructure that easily and cost-effectively accommodates future growth and changes.

By simplifying each phase of the application management process and centralizing deployment of all applications, even those used by remote users, we were able to complete the project in just one month instead of the six months it would have taken. One of the keys to enabling this was the elimination of regression testing, which is used to ensure that applications won't conflict with each other by overwriting one another's systems settings. Since it's estimated that up to 30 percent of Windows applications conflict when installed, regression is critical—yet incredibly time-consuming and tedious. By virtualizing applications and updates, we've eliminated the need for this process and vastly accelerated time-to-deployment. As a result, we can be much more responsive to ongoing end-user needs.

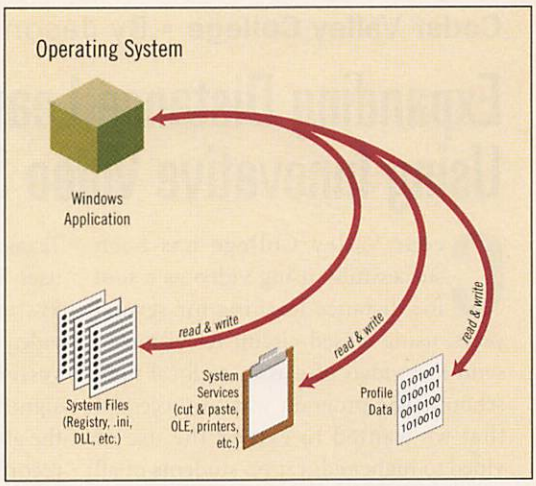


Table 1: Typical Windows installation modifies operating system settings.

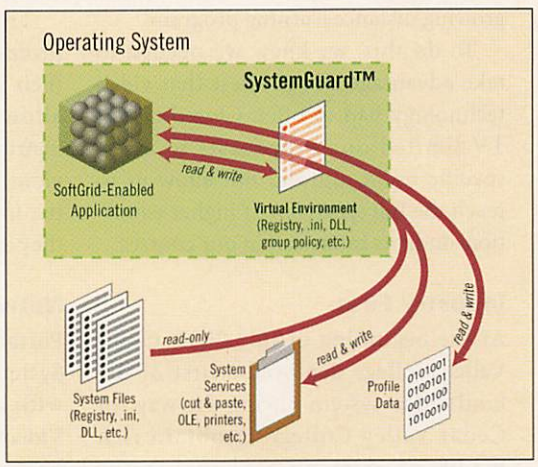


Table 2: Virtual sandbox does not modify host operating system.

Centralized Environment

By eliminating application conflict, we can run any version of Crystal Reports on the same server at the same time. In addition, the applications that we had to manually install on every desktop, now run multiple sessions on each server. As a result, we can centrally deploy and manage all our applications. This is significant because we had chosen server-based computing because of its total-cost-of-ownership savings, but having even one application that can't be centrally managed this way significantly reduces those gains. Being only partially centralized is not enough—the goal is to manage all applications from a single console, and now we can.

Enhanced Security

We can now give students access to key applications and still maintain high security because the applications reside on the network, not the desktop. This also helps us easily manage deployment of critical security patches. Instead of having to go from desktop to desktop installing patches, now all we need to do is make one change on our server and it stays up-to-date Given the increasing frequency of updates and patches with all the viruses and worms that have invaded networks, this has become an essential part of our infrastructure.

Shaun Holtgreive (holtg1s@cmich.edu) *is associate director of Residence Life at Central Michigan University.*

Cedar Valley College ▪ By Jason D. Siegrist

Expanding Distance Learning Program Using Innovative Video System

Cedar Valley College has been successfully using video as a tool for distance learning for several years, using closed-circuit television to send live video of classes to local high schools. The program was so successful that we wanted to extend the use of video to higher education students of all ages and in all locations—including those enrolled around the world in our growing distance learning program.

To do this, we knew we needed to take advantage of the latest that video technology had to offer. Closed-circuit TV limited our broadcasts to a few specific users, and did not allow us to reach the full spectrum of higher education students interested in our courses.

Industry First

At the beginning of July 2003, Cedar Valley College deployed a first-of-its-kind video system paving the way for Cedar Valley College to obtain rich media on-demand, enhancing the higher-learning experience, and increasing the program enrollment, in addition to breaking new ground for colleges of a similar size.

This new system was designed with and installed by VideoCall from Austin, Texas, a video network integrator that uses MPEG-4 technology from VBrick Systems—a provider of networked video appliances and other digital video systems. This new system includes significant selections, such as offering the ability to simultaneously stream and record lectures, and provides multiple channels from the classroom to the viewer.

These unique capabilities allow professors to offer a course live or on their students' time schedule as well as allow students to see and hear the instructor, watch a lab experiment, and view the instructors PC screen, all over the Internet, no matter what bandwidth they are connecting at.

Network Video Appliances

Portable video appliances from VBrick Systems are mounted on a cart along with a camera. The system design by VideoCall allows for the "video cart" to be wheeled from classroom to classroom or to auditoriums around Cedar Valley's campus. By simply plugging the video appliance into any port on the college's existing data network, professors can broadcast or record class sessions and demonstrations.

Cedar Valley College in Dallas, TX and Vbrick Systems collaborated to create a state-of-the-art distance learning program for students.

Students can access these videos anytime simply by clicking on designated links on Cedar Valley's virtual student bulletin board. Because the video appliances compress video and audio into the MPEG-4 format, students can access the video on any PC that is connected to the Internet, no matter what speed connection they have. MPEG-4 video compression with the VBrick VBXcast uses bandwidth more effectively, allowing it to extend the reach of visual communication to everyone with Internet access from dial-up to broadband. Because it is a network appliance dedicated to streaming, VBrick's VBXcast is reliable and easy to set up and use—a big plus for teachers and instructors who may not be comfortable using such advanced technology.

Virtual Classrooms

While Cedar Valley's video system will be used for distance learning classes in all majors, it will be particularly beneficial for the college's veterinary technology program, which is primarily made up of virtual classes attended by students who live all over the world. Now, instead of relying on PowerPoint slides for learning material, students can watch live or pre-recorded class sessions and demonstrations taught by professors. Because the quality and fidelity of video transmissions is so high, remote-learning students can pick up nuances and subtleties of a lecture or lab demonstration that would otherwise be missing from a set of slides or an audio recording.

With the ability to offer up live and on-demand classes simultaneously at any location, Cedar Valley is paving the way for distance learning on a broad scope ahead of the pace of education, but with the cutting edge of technology and education. This collaboration is breaking the geographic boundaries that limit traditional education and eliminating distance from learning.

Jason D. Siegrist (jsiegrist@dcccd.edu) is IS manager at Cedar Valley College in Dallas, Texas.

Virginia Commonwealth University ▪ By Tonie Ellerson

Supporting Systems Management

Located in Richmond, Virginia, Commonwealth University (VCU) is a Carnegie Research University, a research doctoral institution in the state of Virginia. The medical campus at the university is the Virginia Commonwealth Health System—a comprehensive academic healthcenter. The university's extensive information technology (IT) network supports a range of operations, including human resources, finance and administration, records and registration, and business services, as well as faculty and students.

The Challange

Supporting the systems of two university campuses spread over 129 acres and encompassing 162 buildings takes work—and a lot of it. At VCU's administrative customer support center, our Client Services team wears many hats: desktop technician, system administrator and Help Desk support. To manage their systems' complex demands, we've come to rely on LANDesk Management Suite.

We support more than 1,000 desktops all across the sprawling campus, which before LANDesk was not fully centralized in desktop management. This meant that the staff often spent a good part of the day catching the shuttle from one onsite call to another. Adding to the challenge, our team sometimes arrive at a campus destination, only to find that the PC had "corrected itself," or that the customer and PC were not available. A particular challenge in the academic environment is the limited window of time available to do PC lifecycle management, given the vacations, short days and nine-month school year.

Every area has such specialized system requirements, it's very time consuming to have to install applications on some of the switched machines, and remove applications on others. As a result, each staff member was only able to work on about three PCs a day. Yet with everything so tightly networked any downtime, brings most of the university's functions to its knees.

The Implementation

We were able to quickly show ROI, helping to reduce costs, increase IT efficiency and end-user productivity. We can better manage assets with fewer people. Other benefits including allowing teachers and administrators to focus on their day-to-day jobs and not hassle with computer issues. At least once a day someone says how much easier and more efficient things are since implementing LANDesk Management Suite.

Now the staff can schedule and distribute software applications and files automatically, take control of remote desktops to fix problems, maintain compliance with software licenses, capture the latest hardware and software inventory, and keep servers up and running.

VCU uses LANDesk to troubleshoot problems remotely, tally the inventory data and upgrade applications. It's saved us much time because we can help people on the phone while doing something else like scanning a system for viruses. In the half-hour it would have taken a technician to walk to someone's office, we've already completed 10 or more fixes over the phone.

Before implementing LANDesk Management Suite, Client Services was harried and stressed by deadlines. Because the implementation help to refine the process, customer support and technician job satisfaction have improved. Many extra hours were spent upgrading software, but with LANDesk Management Suite, many client applications are completed in minutes.

Better Budget Planning

Often times the IT and software inventories used to be out of date as soon as completed. But with LANDesk, the inventory is automatically updated daily. The cost savings of that feature alone have saved us thousands of dollars. We are able to manage our licenses better and compliance is no longer an issue. As for service, by remote controlling the desktops, VCU increased our ability to handle work orders exponentially. And LANDesk was the only product that handled our Mac clients as well as PC clients.

With VCU's information technology infrastructure under control, we were able to apply a new level of business intelligence on the use of software licenses and scale of technology needs in the university's many departments. We were better able to recommend purchases for the next budget year and determine asset management data required by senior management. We can also do ad hoc queries to better plan needed upgrades; we can tell who has what software before we do an upgrade, or whether it can even be done at all.

LANDesk Management Suite has reduced the downtime for our end-users—they are no longer waiting days for a resolution. We can have our new PCs in the field faster. Our users are much happier in general—and therefore so are we.

Well-managed computers for students and teachers has been integral in the success and high education standards of VCU.

Tonie Ellerson (tmellers@vcu.edu) *is manager of Desktop Applications Support for Client Services at Virginia Commonwealth University.*

New Media Consortium ▪ By Laurence F. Johnson

An Experiment in Social Computing

The NMC is an organization dedicated not only to engaging its 170 member institutions on timely topics of current interest and emergent thinking, but also one that strives to walk the walk in the ways it uses technology. As an approach to helping members stay on top of an ever-changing technology landscape and the never-ending flow of new ideas and information, the NMC wanted to find a high-tech, high-touch system that leveraged technology to bring a community of practitioners together.

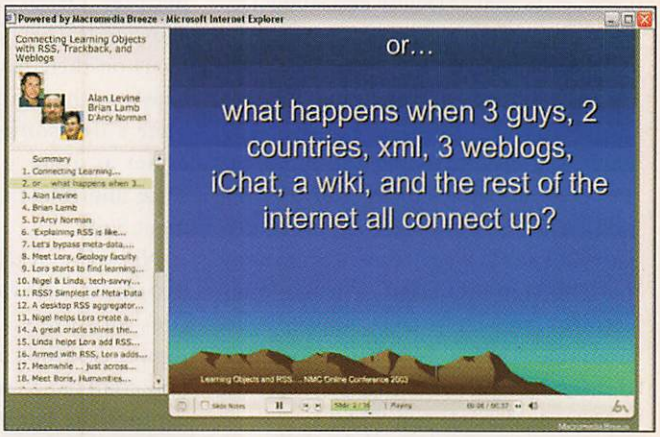
In creating the NMC's series of Online Conferences, the consortium partnered with iCohere and Macromedia to conduct a real-time experiment in social computing. they hoped to use common tools in new ways, and in the process bring people together in a way that encouraged substantive interaction, dialog, and knowledge sharing. They wanted to create an online conferencing experience that gave people the opportunity to engage with one another using real-time audio, real-time chat and real-time video—and at times and on terms defined by conference participants. At the same time, they wanted the experience to feel like a face-to-face conference in as many ways as possible. Helping attendees feel at ease and that they were part of a dynamic gathering of people were explicit goals of the experiment.

With this focus on a dynamic social computing experience, the inaugural NMC Online Conference applied many principles of successful conference planning to the online setting. Virtual keynotes set the tone for each day of the four-day event, and daily presentations on selected themes provided the same intellectual richness that one expects in a face-to-face conferencing environment. Event planners went so far as to provide virtual exhibit space for event sponsors and a daily virtual "happy hour" with presenter and attendees to discuss new ideas and future collaborative directions. The goal was to make the event feel as much like a real conference as possible.

The featured sessions provided in-depth information on a wide range of subjects; being available on a 24 X 7 basis gave participants the opportunity to review and revisit sessions whenever they desired. Key resources—articles, links, and related materials—were included in almost every room of the conference, and poster sessions and a gallery provided many examples of interesting learning objects. Session attendees had a variety of options each day. Some events were live, while others could be accessed at any time. Even live events, however, were carefully captured, and made available to participants as on-demand experiences. Asynchronous access to presentations and dialogs allowed attendees time to review materials, and to share them with colleagues.

Several attendees commented on how they appreciated having the opportunity to participate in a professional event without the requirements of travel or being away from the office for an extended time. They enjoyed having the ability to pause and refer to posted resources. Materials had been developed with an eye for both narrow-band and broadband participation, which increased the flexibility for people who would join session during the day on the university broadband network and at home on their personal dial-up service.

In retrospect, the secrets to success came in anticipating what it would take to keep participants engaged and interested. Among the most important lessons learned were that in spite of being a technology-mediated event, the true richness of the experience reflected the care that organizers took to maximize the interaction experiences among participants. The goal was to make it fun to participate, and to make that happen, the organizers paid a lot of attention to the little things.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D'Arcy Norman
Summary
or...
what happens when 3 guys, 2 countries, xml, 3 weblogs, iChat, a wiki, and the rest of the internet all connect up?

A team of hosts personally welcomed attendees as they logged on. IM postings helped people see how to use the tools. Presenters were recruited at various times during the conference to add a spark to the online discussions and chats. Another team invited stragglers into live chat sessions as they started up. Online discussions underscored the focus on person-to-person communication that made attendees describe this conference as such a rich experience. Indeed, the most common comment was that people wished they had budgeted more time to attend the event, as it turned out to be far richer than they had anticipated.

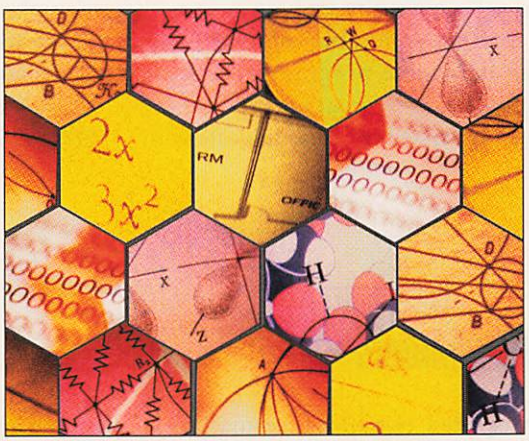
Laurence F. Johnson, Ph.D. ***(johnson@nmc.org)*** *is CEO of the New Media Consortium.*

FEATURED PRODUCT ■ MOSAIC

Mosaic: Composing a Picture of Student Experience

One can define a portfolio as either a case or folder into which one puts documents or the collection of documents itself. Either way, the metaphor—a cache of one's work—expresses the intent of those who teach using a portfolio system.

Using portfolios in teaching is not a new idea. Composition instructors have incorporated them into their courses for some time. The highly flexible tool works with just about any teaching approach. However, only recently have universities come to view the portfolio as a way for students to develop a body of work that encompasses not just the accomplishments of a single course in a single semester, but the accumulated achievements of an entire college career. At the same time, portfolios have moved from the print environment to the electronic world. Hence, the creation of what is now known as the ePortfolio.



An ePortfolio has many advantages over a paper portfolio. The materials within them can be instantly copied and shared with those who need them. There are no storage issues, the material doesn't degrade over time, and the content can be customized for a particular reader. What's more, a good ePortfolio allows one to enter new information only one time knowing that all necessary components of the portfolio will simultaneously be updated.

The Open Source Portfolio Initiative (www.theospi.org) is a collaboration of several universities to build, maintain, and continuously improve an open source portfolio that is available free of charge to any user. The project originally began at campuses of the University of Minnesota. The school donated the code that launched the open source project. Since then, many other institutions, including The University of Delaware, University of Rhode Island, University of Michigan, Indiana University, the Carnegie Foundation for the Advancement of Teaching, and the r-smart group have joined OSPI's efforts.

In July 2003, the consortium released OSPI code. In August, the r-smart group (www.rsmart.com) released Mosaic, an enhanced version of the Open Source Portfolio software. The software is available free of charge to users who join the r-smart network. Network members pay r-smart for comprehensive service and support, including training and installation if desired. In other words, a campus can download OSPI for free or Mosaic for a cost. The difference is support: r-smart offers guaranteed support, as opposed to the informal support one would get from joining OSPI alone.

The r-smart group is a commercial operation, but it works with institutions to support an open source portfolio. Along with the other member institutions r-smart contributes its software engineering expertise to develop and improve the product.

"When a school selects Mosaic it gets expert support. They still get the freedom to use the software, modify it, and share it again without restriction, but they get the assurance that we're there to support it," says Chris Coppola, the r-smart group's president. He adds, "Our aim as a company is to fill a void supporting open source software in higher education."

How does an ePortfolio work? An ePortfolio works effectively as a classroom tool. An instructor might assign students to collect, share, and assess their work within the portfolio software.

Mosaic is designed to provide internal rewards, as it helps students build a portfolio of milestones and successes. It also serves as a means of internal feedback; students can access

An ePortfolio has many advantages over a paper: materials can be instantly copied and shared...

In Mosaic, students navigate using the devices *enter, share, and view.* Mosaic allows students to gather their work into the portfolio, reflect and learn from it, choose particular elements, and collaborate with others for feedback and guidance. Instructors can comment on the work within the portfolio.

Although an ePortfolio has obvious classroom applications, one could also use Mosaic as a resource for an entire college career. According to Janice Smith, Education Consultant for the r-smart group, the visionaries behind the original open source portfolio project created a tool that would help guide students through a review of their personal data, strengths, skills, experience, and achievements. As Smith says, students are "required to manage their identities virtually. Students who create an ePortfolio build self-esteem by learning to present themselves to the world."

their records in the student information system as part of the portfolio package. Furthermore, used as an orientation tool, it encourages students to gather all of their personal information into one place, including high school records, academic data, and extra-curricular activities. It is easy to imagine the ePortfolio serving as a resource for resume building, career planning, and the job search. After graduation, students can take the portfolio data with them. One way to do this would be to simply capture snapshots of the data in a fixed and unchangeable form. Students might also download the application itself (no charge) or access their data by entering the application through a university account.

Another application of ePortfolios may be degree programs. Students within a degree program may use the portfolio system to communicate with advisors and introduce work from introductory courses into more advanced courses that may rely upon the fundamental knowledge previously gained.

"A program-level ePortfolio can be particularly helpful when an academic field is required to apply disciplinary, state, or national standards to student work in order to facilitate professional degree certification," says Smith.

An ePortfolio system may also serve as the basis for institutional assessment. With everyone's permission, the data gleaned from the samples and evaluations therein could serve as "a storehouse of evidence that the institution is achieving its goals," states Smith. This storehouse will come in handy as the institution prepares for accreditation, funding, or applying for grants.

Over 1,100 people have signed up to view the demonstration version of the Open Source Portfolio on (www.theospi.org). Most interested institutions have been universities; although over 60 have been community colleges.

"Schools that use Mosaic become part of an international community of users who not only directly benefit from the software but also contribute to improving it continuously," says Coppola.

Contact: ***r-smart group****, Phoenix, AZ; (602) 840-7300; www.rsmart.com.*

PRODUCT ROUNDUP

ERP for Education

A Sampling of Today's Major ERP Vendors

Oracle

Oracle has designed the E-Business Suite to be a comprehensive, integrated set of applications for the higher education market that automates and streamlines nearly every facet of campus operations and administration, including financial management, human resources, procurement, recruiting, admissions, financial aid, grants management, project management, regulatory compliance, portal development, and communication (integrated e-mail, voice-mail, fax, scheduling, and calendar). Oracle is the only large ERP vendor to offer a calendaring solution.

Available by modules or as a complete suite, Oracle Applications are intended to help higher education institutions achieve a higher level of operational insight, facilitating more informed management decisions. Oracle also claims that the applications create a collaborative environment for teaching, learning, research, and community service—reducing operating costs by streamlining processes across a common architecture.

Oracle E-Business Suite, which includes the Oracle Student System, is built on a unique single data model, which lessens the overall complexity and improves visibility by consolidating campus-wide information to create a single instance of information for all applications. For example, the model maintains only one record for a person,

general ledger account, applicant, alumnus, etc. This capability means a change made to a record in one department will be available immediately to all other system users.

Oracle's architecture enables higher education institutions to implement and update applications with little or no integration, reduce maintenance costs due to fewer integration points, centralize IT operations to reduce costs and focus resources on mission-critical initiatives, access real-time data across the institution, and improve security by reducing vulnerability points.

Contact: ***Oracle Corp,*** Redwood Shores, CA; (650) 506-4051; www.oracle.com.

PeopleSoft for Higher Education

The PeopleSoft for Higher Education solution includes the following roles-based components: Student Administration, Human Capital Management, Contributor Relations, Customer Relationship Management, Financial Management, Supplier Relationship Management, Grants Management, Asset Management, Real Estate (in development), and Analytics. Within the student administration suite are solutions for creating a campus community, recruiting, admissions, academic advising, student records, financial aid, and student financials. The PeopleSoft portal helps institutions build a virtual campus. On the portal, institutions can integrate PeopleSoft applications, third-party applications, and institution-based applications. Using the PeopleSoft Enterprise Performance Management system, institutions can break down financial and operational data for better overall efficiency and service.

PeopleSoft claims to have the only "pure Internet" enterprise system, a system that is completely Web-enabled. This facilitates a one-time, one-place installation. It also means administrators can access the system anywhere, anytime. Also, PeopleSoft's "Total Ownership Experience" promises easier use, easier upgrading, and a more cost-effective solution. TOE features such as the "express installation tool" and a new setup manager tool reduce installation time from weeks to days and a shorter upgrade time.

Contact: ***PeopleSoft,*** Pleasanton, CA; (800) 380-SOFT; www.peoplesoft.com.

SAP Solution for Higher Education and Research

The SAP solution for Higher Education and Research supports an institution's business operations and provides support for teaching and research. It consists of systems for campus and financial management as well as management of human resources, grants, customer relationships, product life cycle, and supplier relationships.

Campus Management is the SAP Student Information System for managing the student's "lifecycle" from admissions to graduation. The Grants Management component has an emphasis on post-award management, budgeting, and resource control. Customer Relationship Management includes alumni relationship management, the call center, and Web access. The SAP solution also includes the Learning Solution, a lifelong learning, distance learning, and curriculum management system; Business Intelligence, for reporting, data-mining, and strategic enterprise management; the Enterprise Portal, which comprises the student portal, university portal, and employee portal for access to and integration of data; and Workflow, for seamless integration of business process data and transactional information.

These applications run on the SAP "NetWeaver" platform, which provides a single technical environment for the integration of SAP and non-SAP applications, and for structured and unstructured data (e-mail, for example). Although broken down into components, the SAP solution is actually a single application an integrated approach. The SAP Campus Management runs on one database.

SAP prides itself on its commitment to R&D, innovation, and user-oriented design. The innovative Campus Management student information system has been built by SAP from the ground up from the student perspective, not that of the administrator. The SAP solutions are designed to be flexible and scalable with no loss of performance or response.

Contact: ***SAP,*** Newtown Square, PA; (610) 661-1000; www.sap.com/.

SAS

SAS offers a life-cycle approach to data collection and management. The component-based SAS Intelligence Architecture is an open, extensible framework. By integrating and augmenting current technologies and resources, this flexible framework makes the most of existing operational infrastructures, scales with growing enterprises, and adjusts to meet changing organizational needs and goals. The framework includes SAS's renowned data integration system, advanced analytics, activity-based management (a complete modeling environment for analyzing and comparing data), and performance management. Also included is a portal that enables collaboration and the sharing of information with appropriate internal and external audiences.

By using SAS Strategic Enrollment Management, organizations can collect data from any source at all contact points, including legacy systems, ERP systems and the Web; perform advanced analysis to predict needs without spending inordinate amounts of time, money or other resources; target audiences for services, campaigns, and information; and offer program performance and reports to appropriate individuals.

With the financial management system, traditional measures, such as income statements and balance sheets, can be combined with intangible assets, such as the lifetime value of alumni. SAS Human Capital Management allows institutions to plan effective human capital strategies by comparing and measuring best practices.

Contact: ***SAS,*** Cary, NC; (919) 677-8000; www.sas.com.

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Reflections, *continued from page 42*

mechanics themselves, saw cars as simple logical machines. One doesn't have to be a rocket scientist to code XML—I mean change spark plugs. Everyone understands the basic principles of relational databases—I mean auto electrical systems. Tom and Ray used self-service to turn users into auto mechanics. But their users were not mechanics, couldn't quickly become mechanics and didn't want the greasy, messy work, which they couldn't handle anyway. They just wanted their cars fixed cheaply.

Wa Wa uses self-service to give users more control over their hoagies. They give customers a simplified and improved user interface, make the outcomes more reliable, and at the same time make back-end operations (the making of hoagies) much more efficient. Had Wa Wa followed the Tom and Ray model, their customers would have made their own hoagies. Imagine the chaos of unleashing Wa Wa customers behind the hoagie counter with electric deli slicers, sharp knives, pots of boiling chili, and jars of double-dipped condiments.

Wa Wa's self-service endeavor cost a great deal of money for screens, wiring, training, support, and so forth. No one lost their job because of it—because Wa Wa's goal was better service, not lower cost. They offer customers fast access to correctly made personalized hoagies. Their touch screens are simple and colorful, with pictures and text for every choice. They do one simple thing. Wa Wa had the technology to have the screens do banking, buy money orders, and do Excel spreadsheets, but they resisted that temptation. Wa Wa clearly understood the specific problem they were trying to solve and understood their users' needs and abilities. They spent the money to build something to save their users time—not to lighten their own load, which actually increased.

Most IT users are not IT professionals and have no desire to become one. However, all users would benefit from having control over the information and applications that they rely on to do their jobs effectively. Using Wa Wa's philosophy for self-service as our model we will have our users choosing the exact data and applications each one needs. They'll get great service effortlessly, our systems and data stores will run more efficiently, and all of us will find that quite a tasty combination.

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ERP, *continued from page 30*

party software much easier. It's easy to bolt on a voice response system or credit card management system," says Shepard. "ERP forces you into a new architecture—client/server—and makes you do some relational housekeeping. That can benefit an organization enormously."

George Washington University took advantage of the ability to build onto their ERP system by installing a new online housing system this year, which allows students to match themselves with a roommate and find a room on campus. The system, something like an online dating service, won an EDUCAUSE award for best new application.

What's the future of ERP? Web-based platforms, says Shepard. "Almost all of the vendors are moving in the direction of pure Internet."

Wasik foresees a shared service model for state institutions—multiple campuses in a statewide system sharing the same system for transactions, data warehousing, and metrics. "We don't all have that many different approaches to human resources and other processes," he says. "Why do we need so many different systems?"

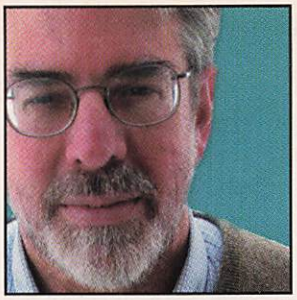
The future involves service, portals, online access, and security, says Swartz, "In higher-education, we don't often like to think of what we do as providing services. But we are providing services of all types. [ERP and portal technology] allow us to push more of the mundane aspects of service to the Web, where it will be available 24/7 and where we can track the status of a service request as it's being addressed. This will all be transparent to the user. Along with call centers and help desks, we can manage 80 to 90 percent of the requests. The specialists [advisors, support staff, faculty] are now freed up to knock out the more serious, complex problems."

Swartz also foresees a future in which ERP will replace paper documents with electronic ones. "There will be no more paper bills, contracts, and other such documents," he says. "This is essential: in order to leverage the massive investment in ERP we have to get there [to online documents]. It's amazing how much money you save by doing this. At GW we found enough ROI in just two offices to justify going to online contract management."

Moving documents online will also be more secure, Swartz says. "The perceived need for security and privacy has grown exponentially. Online documents are much easier to manage and secure than hard copies. We can prevent the printing of online documents, control who has access to them, and block out SSNs. Paper copies are much harder to secure."

Inevitably, corporate consolidation will force the merger of more of ERP providers, says Wasik. "The number of choices has already decreased. We are going to see fewer vendors, fewer options. This is economical on the one hand, although it's less personalized."

Catherine Murphy (cathy@editrix.com) *writes about educational technology issues and lives in Santa Cruz, California.*



Howard Strauss

REFLECTIONS

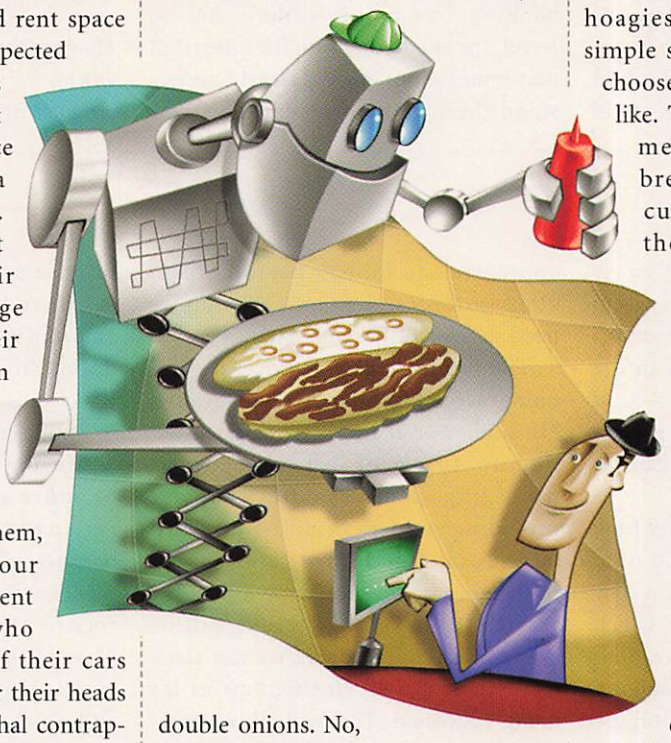
ANOTHER LOOK AT EDUCATION TECHNOLOGY

Just Help Yourself

In the early 1970s, Tom and Ray Magliozzi, from National Public Radio's Car Talk, opened a garage called Hacker's Haven in Cambridge, Mass. "This was the time when everyone was working on his own car, so we thought, and our idea was to open a garage where people could do their own work and we'd rent space and tools to them." Ray expected to make "wheelbarrows full of money" as a result of this clever self-service idea, but instead it was a fast track to financial ruin. Customers who could not open the hoods of their cars came to the garage expecting to replace their own transmissions. Tom and Ray (and expensive professional mechanics they hired) had to help these folks, usually doing all the work for them, for the $2.50 per hour customers paid just to rent garage space. Users who *could* open the hoods of their cars attempted repairs far over their heads and drove off in their lethal contraptions. After one such customer *repaired* his car, Tom and Ray watched in horror as, "Amazingly, the thing started up. We watched as he drove his car out the door, stepped on the brake pedal, and crashed that wreck into the building across the street." The garage was soon converted into a regular non-self-service garage where Tom and Ray could actually make money and customers were not a danger to themselves and others.

Hoagie Heaven

Wa Wa, an East coast chain of convenience stores, sells 35 million built-to-order hoagies each year. At lunch time, a dozen or so customers would often collect in front of the deli counter and shout things such as, "Gimme an Italian with no mayo; double onions. No, I do want mayo, no peppers; well, mild peppers on the side. Do you have Virginia ham? Use that instead of the turkey or salami." The hoagie makers behind the counter frantically tried to make sense of the crowd barking their orders while at the same time making the right hoagies and getting them to the people who actually ordered them. Of course communications were bi-directional. Hoagie makers shouted back things such as "Is that a Junior, Shorti, Classic, or 2 foot? Do you want salt? What kind of cheese?" It's a wonder that any hoagies ever came out exactly right.



Today in many Wa Wa's the chaos has been replaced by a few self-service touch screens. Customers are led through different kinds of hoagies and myriad options one simple screen at a time in order to choose the exact ingredients they like. The screen also markets new menu items—"Try our new breaded chicken," and makes customers aware of options they may not have known about. Customers can make changes, price different options, and print a receipt, which they can pre-pay.

The hoagie makers read final orders from a LCD panel in a standard format that reflects the way they make hoagies. They spend all their time turning out perfect hoagies as efficiently as they can. If a customer really needs help with the touch screens, a Wa Wa employee will step in, though usually it is other customers who provide user support.

Self Service

IT departments increasingly build self-service applications for their users. Before you dash off and do that, it would be helpful to understand why Wa Wa's self-service was so successful while Tom and Ray's was such an abysmal failure. Tom and Ray, as skilled

continued on page 41

SONY

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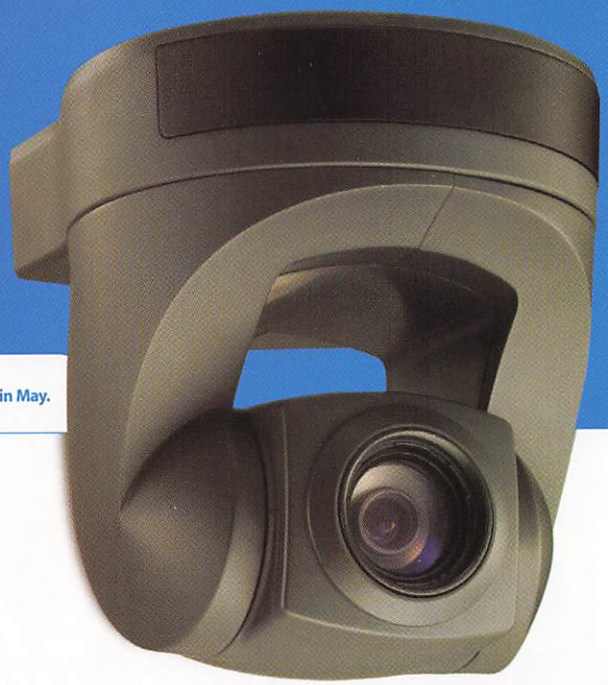

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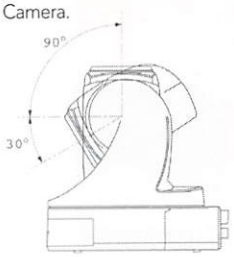

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FOR MORE INFORMATION ON THE EVI-D70, AND SONY'S FULL LINE OF ROBOTIC CAMERAS, VISIT WWW.SONY.COM/VIDEOCAMERAS

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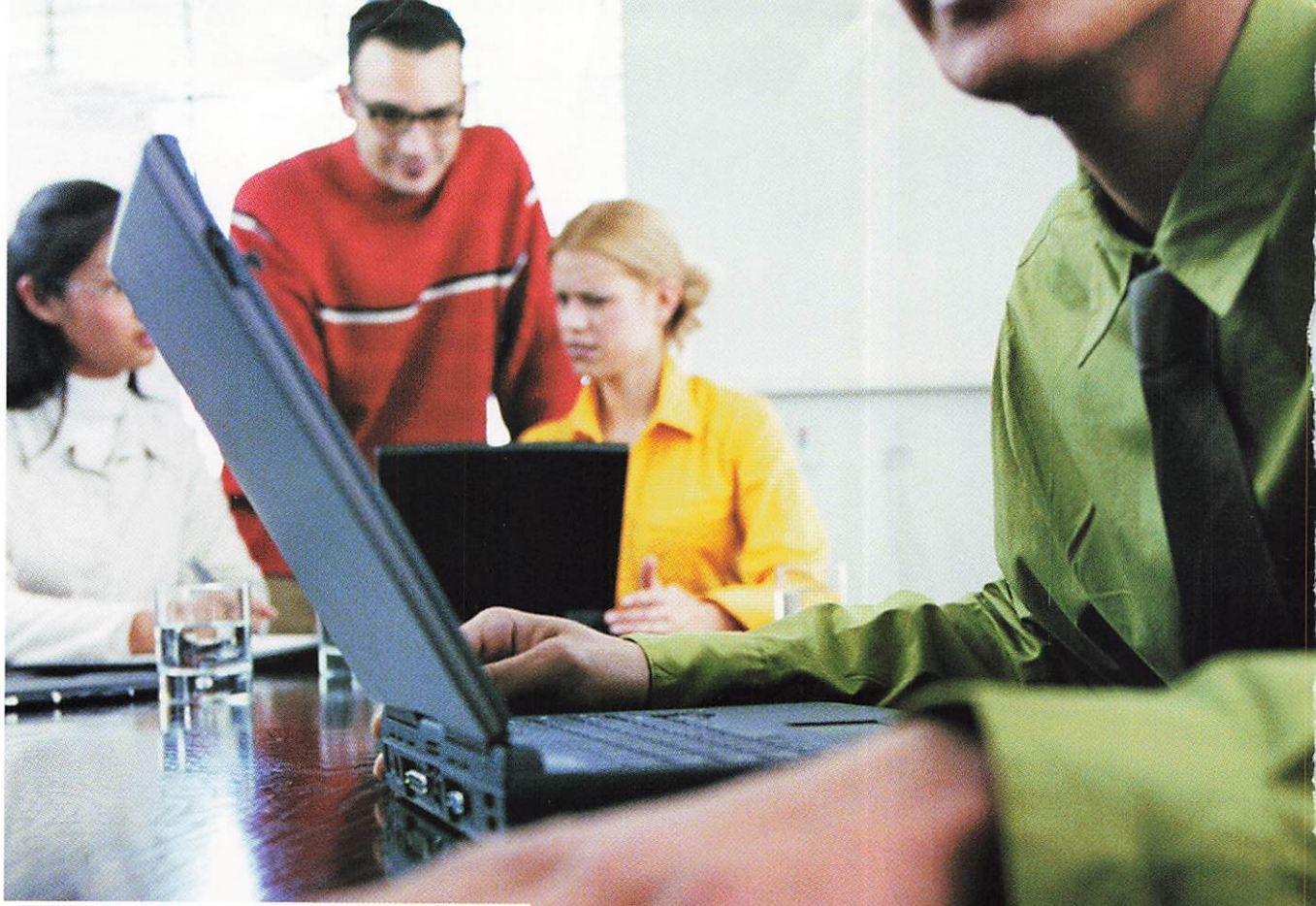

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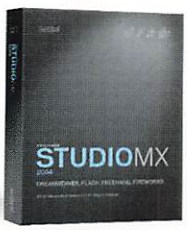

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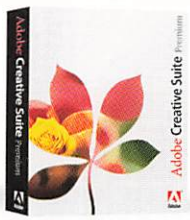

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